

The Foundations of the Science of War

by

Colonel J. F. C. Fuller

FSW JFCLF

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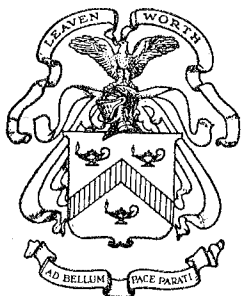


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PREFACE

Major General John Frederick Charles Fuller was, and remains, the most brilliant, most stimulating, and most arrogant and aggravating military writer of the twentieth century. Fuller, an infantryman, first saw modern combat in the Boer War. During World War I, he was the GSO1 of the Tank Corps. Thereafter, he was one of the leading theorists of armored warfare in the 1920s and 1930s and wrote forty-five books on warfare, theoretical tracts, histories, and studies of generalship during an extraordinarily productive life as a molder of opinion on military affairs.

Fuller's books, like their author, could be exasperating, opinionated, and bright — all at the same time. Fuller retired as a major general but was largely unemployed after turning down command of the experimental armored force in the late 1920s over a matter that to him involved principle but to everyone else was of little consequence (having to do with ancillary administrative duties he was expected to accomplish). In the late 1930s, he became a supporter and adviser to Oswald Mosley's British Union of Fascists and only narrowly escaped internment when war broke out.

The Foundations of the Science of War is a compilation of material presented by Fuller when he was chief instructor, Staff College, Camberley. Dating from 1926, it is the culmination of his theoretical writings and an early attempt to fit mechanization into the fabric of European warfare. In this work, Fuller presents a comprehensive theory of war. While it does not reach the heights to which Fuller aspired, it retains the ability to stimulate and provoke thought seventy years after it first appeared.

Two excellent intellectual biographies of Fuller are available today: Anthony John Trythall, *"Boney" Fuller: Soldier, Strategist, and Writer, 1898—1966*, and Brian Holden Reid, *J. F. C. Fuller: Military Thinker*. In addition, many of Fuller's books remain in print in commercial editions.



RICHARD M. SWAIN
Colonel, Field Artillery
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The Foundations of the Science of War

By Colonel J. F. C. Fuller, D.S.O.

*Author of "Tanks in the Great War," "The Reformation
of War," "Sir John Moore's System of Training," etc., etc.*

*The first Creature of God, in the workes of the Dayes,
was the Light of the Sense ; the last was the Light of
Reason.—FRANCIS BACON.*

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THE FOUNDATIONS OF
THE SCIENCE OF WAR

To
MY WIFE

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PREFACE

The world is waking from its phantom dreams,
To make out that which is from that which seems.

—GERALD MASSEY.

I. THE ORIGINS OF THE BOOK

THE origins of this book may be of some interest, as the system outlined in it has been one of gradual growth, and, whatever value it may possess, it is the result of fifteen years' study and meditation.

In the autumn of 1911 I spent my leave in northern Germany, and returned to England convinced that a European war might break out at any moment. This realization stimulated my interest in military history, and to prepare myself for the inevitable and rapidly approaching struggle I turned to the *Field Service Regulations* (1909 edition) for assistance. On the first and second pages of Part I. I found the following :

The fundamental principles of war are neither very numerous nor in themselves very abstruse, but the application of them is difficult, and cannot be made subject to rules. The correct application of principles to circumstances is the outcome of sound military knowledge, built up by study and practice until it has become an instinct.

This was excellent, but what were these fundamental principles? If they are neither numerous nor abstruse they must be few and simple, but not one was mentioned in the book, consequently it appeared to me that, unless I knew what they were, the *Field Service Regulations* was of little use. I determined, therefore, to discover these hidden truths.

I turned to the *Correspondence of Napoleon* and studied it closely, and during 1912 I had come to the conclusion that the principles which had guided Napoleon were as follows :

. . . The principle of the Objective—the true objective being that point at which the enemy may be most decisively defeated ; generally

this point is to be found along the line of least resistance. The principle of Mass—that is, concentration of strength and effort at the decisive point. The principle of the Offensive; the principles of Security, Surprise, and Movement (i.e. rapidly).¹

I had now got six working principles, and, being satisfied with them, I was able to devote more time to Hall and Knight's elementary mathematics, the bugbear of the old Staff College examination, which I passed in the summer of 1913.

Whilst at the Staff College I applied my principles and found them a great help. Then came the war, and, in December 1915, I wrote an anonymous article for the *R.U.S.I. Journal* entitled "The Principles of War with Reference to the Campaigns of 1914-15." This article was published in February 1916, and to the former six principles I added two new ones—the principle of economy of force and the principle of co-operation. In the summer of 1917 General Kentish, who was then in command of the Commanding Officers' School in Aldershot, asked me to lecture on these principles, and I did so, and also on several other occasions. In March 1918 my lecture was published by him as a pamphlet.

So far these principles could only be looked upon as a pure hypothesis deduced from the campaigns of Napoleon and checked by the events of the Great War. In 1919 I was able to give them more thought, and I began to collect evidence in order to test them. This year a committee was assembled by the Army Council to rewrite the *Field Service Regulations*, and the chairman of this committee one day said to me: "I believe you have written something on the principles of war. May I have it?" I gave him a copy of the above-mentioned pamphlet. In 1920 the principles I had laid down were, in a slightly modified form, included in the new edition of the *Field Service Regulations*.

In July 1920 I wrote an article for the first number of *The Army Quarterly* entitled "The Foundations of the Science of War," in which my system was explained, and in 1922 I developed this system in chapter iii. of my book, *The Reformation of War*, which was published in February 1923. Between August 1922 and January 1923, being on half pay pending taking over an appointment at the Staff College, Camberley, I outlined and eventually wrote a series of some fifty lectures on "The Science of War" and "The Analysis of the Art of War." These lectures were given to the 1923 batch of Staff College Students, and were based on the following theory:

¹ See *Training Soldiers for War*, by the writer, p. 42. This little book was written in 1912 and 1913, and published in November 1914.

We start with man, and from man extract four elements :

- | | | | | | |
|--------|------------------|----|------------|----|--------------|
| (i.) | Mental power | .. | Mind | .. | Control |
| (ii.) | Protective power | | Protection | .. | Stability |
| (iii.) | Offensive power | | Weapons | .. | Activity |
| (iv.) | Mobile power | .. | Movement | .. | Co-operation |

From these elements I evolved four elementary principles, namely :

- (i.) From mind, the principle of the objective.
- (ii.) From protection, the principle of security.
- (iii.) From weapons, the principle of the offensive.
- (iv.) And from movement, the principle of mobility.

I next postulated a law, which I called "The Law of the Conservation of Military Energy," and from it extracted four accentuating principles of war, namely :

- (i.) The principle of surprise.
- (ii.) The principle of economy of force.
- (iii.) The principle of concentration of force.
- (iv.) And the principle of co-operation.

Though these principles were of great assistance to me in working out problems in the physical sphere of war, it was difficult to apply them to mental and moral action. As regards mental action, I devised a co-efficient for each of them, and as regards moral action, from will, *moral*, and fear, I deduced three moral principles, namely :

- (i.) The principle of determination.
- (ii.) The principle of endurance.
- (iii.) And the principle of demoralization.

In the autumn of 1923, having set these lectures together in book form, I submitted them to my friend, Captain B. H. Liddell Hart, and asked him to be unsparing in his criticism. This he certainly was, and his analysis of the MS. led to several prolonged discussions, particularly as regards the nature of the "threefold order" and the nomenclature of the principles of war. From his criticism I realized that the lectures were too complex, and that simplification was necessary. I consequently determined to rewrite the book, and if simplification has in any way been attained on the almost unexplored subject dealt with, I particularly wish to acknowledge my debt of gratitude to Captain Liddell Hart, and also to thank him for having read through and suggested amendments to the MS. of the book as it now appears.

I spent such spare time as I had in 1924 in reconsidering each

step in my system, and it was not until January 1925 that I began to rewrite the book in its present form. A difficulty I unfortunately could not avoid was changing the names of some of my old principles, which, in the 1924 edition of vol. ii. of the *Field Service Regulations*, appear as follows :

- (i.) Maintenance of the objective.
- (ii.) Offensive action.
- (iii.) Surprise.
- (iv.) Concentration.
- (v.) Economy of Force.
- (vi.) Security.
- (vii.) Mobility.
- (viii.) Co-operation.

For the first I substituted the principle of direction, which is both more general and more accurate.

For economy of force I substituted the principle of distribution, and exalted economy of force to the position of the law of war.

I scrapped co-operation and introduced two new principles, those of endurance and determination, and left principles (ii.), (iii.), (iv.), (vi.), and (vii.) as they were.

I am of opinion that the whole system, though still far from perfect, has been greatly simplified by these changes. Though the principles have grown from eight to nine, they can, as I show in chapter xi., be reduced to three groups, namely, principles of control, resistance, and pressure, and finally to one law—the law of economy of force. Thus the system evolved from six principles in 1912 rose to eight in 1915, to, virtually, nineteen in 1923, and then descended to nine in 1925, with the added advantage that these nine can be merged into three, and these three into one law.

2. THE OBJECT OF THE BOOK

The book is what it is called, namely, a *foundation* of the science of war, or, at least, of a science of war, and, as I have spent over fifteen years in planning this foundation, I hope that military students will examine it, not only for its own worth, but in order to think of war scientifically, for until we do so we shall never become true artists of war.

I have stressed the scientific aspect of my subject, not that I am a trained scientist, for I am only an amateur, but because soldiers must realize what civil science means, and if, to-day, they spent half as much time in studying science, not forgetting a little philosophy, as they do in playing games, we ought to produce a very fine crop of generals.

To the scientist I have no doubt that my knowledge of science will prove limited, and possibly out of date, for, though I read a large number of scientific and philosophical works between the years 1898 and 1911, since 1912 I have found little time to continue this study; besides, I have seldom had the advantage of conversing with men of science.

In this book I have not attempted to apply my system historically; this I must leave for another volume; neither have I attempted, when dealing with the principles of war, to examine each principle in the same way. My examination may appear chaotic, but it is purposely so in order to accentuate the catholicism of these principles. A fault the critic will discover is repetition. Yet this again has been done on purpose, if only because Napoleon said: "There exists but one figure of speech for the crowd—repetition"; and Herbert Spencer said: "By iteration only can alien conceptions be forced upon reluctant minds."

Those who criticize this book must remember:

(i.) That the subject is all-embracing, and, consequently, must be incomplete.

(ii.) It is written in advance of the military thought of to-day.

(iii.) Many of the problems contained in it are very complex.

(iv.) And some of the terms I have used are vague, for scientific military terminology is sadly lacking in definition. Thus what is exactly meant by that semi-mystical word, *moral*?

To the civilian I think that this book may be of use, not only in studying war, but in studying any of the activities of life. As regards war, he must realize that everything is changing. We are faced by air warfare, and mechanical warfare on land, and submarine warfare at sea, and chemical warfare everywhere. What are the tendencies and values of these changes? This is not only a military question, but a national and an imperial question, for the defence forces exist for the empire, consequently every man and woman in the empire is *personally* concerned with their efficiency. To-day every other man (and still more so during war-time) is an amateur strategist and tactician; the House of Commons is full of such folk. No politician would be considered sane if he told a chemist or an astronomer what to do, but he considers it his right to tell the soldier, sailor, and airman what to do, and even how to do it; and if his words are not based on a true understanding of war they are based on a false understanding, for there can be no middle course.

Why this difference? It is because the soldier is ignorant

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of his own profession. He will not use his brain save as an alchemist; consequently, the older he grows, the more his power of thought degenerates. As in "the stalactite caves of Carniola the blind salamander, Proteus, is found in great numbers, also blind assels, blind cyclopida, blind insects, and snails,"¹ so also in the fighting forces are to be found blind admirals, blind generals, and blind air marshals, because "any new set of conditions occurring to an animal which renders its food and safety easily attained seem to lead as a rule to degeneration. . . . Let the parasitic life once be secured, and away go legs, jaws, eyes, and ears; the active, highly-gifted crab, insect, or annelid, may become a mere sack, absorbing nourishment and laying eggs."² What a prospect for a Sandhurst cadet!

In this book I am attempting something new—at least, new since the days of Henry Lloyd and Robert Jackson; for, as far as I am aware, these are my only two fellow-countrymen who have attempted to reduce war to a science. In a small way I am trying to do for war what Copernicus did for astronomy, Newton for physics, and Darwin for natural history. My book, I believe, is the first in which a writer has attempted to apply the method of science to the study of war; for Lloyd, Jackson, Clausewitz, Jomini, and Foch did not do this. In a few years' time I hope that it will be superseded by many a better work, so that we all may begin to understand the nature of war, and thereby discover, not only how to prepare for war, but how to restrict its ravages; how to harness it, and possibly, also, how to transmute the destructive ferocity of the ape into the creative gentleness of the angel.

J. F. C. F.

Staff College,
Camberley,
November 20th, 1925.

¹ *The Open Court*, No. 105, p. 1803. ² *Degeneration*, R. Lankester, p. 33.

THE FOUNDATIONS OF THE SCIENCE OF WAR

CHAPTER I

THE ALCHEMY OF WAR

Nothing is more terrible than active ignorance.—BOSSUET.

The art of war is like that of medicine, murderous and conjectural.—VOLTAIRE.

I. THE VALUE OF MILITARY HISTORY

THE history of war is a great romance, but as yet no true science of war has been written. For long the history of man and his perplexing ways were treated as a story, but in recent years the method of science has been applied to civil history, and to-day many historical works exist on the social, commercial, religious, and political evolution of nations. From these the student can discover, not only the sequence of past events, but their tendencies, and, above all, the probable direction of these tendencies in the future.

Though war is the oldest of the arts, no such method has as yet been applied to it. I will not say that attempts have not been made, for they have, but with little success; for most of the great writers on war lived before the advent of the present scientific age, and those who have written since have been obsessed by traditions. Guibert, in his *Essai Général de Tactique*, deplures "that whilst all other sciences are being perfected, the science of war remains in the cradle."¹ Lloyd, writing at about the same time, says: "It is universally agreed upon that no art or science is more difficult than that of war . . . yet those who embrace this profession take little or no pains to study it."² Robert Jackson, an English military surgeon, in 1804, sets out to examine the structure of war, "in order to inculcate useful truth" rather than "to furnish transient amusement."³ His book still deserves study, and so does Lloyd's. Jomini is a great artist and geometriician of war, but little else, for he looks upon war mainly as "a

¹ *Œuvres Militaires de Guibert* (1803), vol. i., p. 97.

² *History of the late War in Germany* (1781), part ii., p. vi.

³ *A Systematic View of the Formation, Discipline, and Economy of Armies* (1804), p. 12.

terrible and impassioned drama" ¹; yet, "I have seen," he says, "many generals—marshals, even—attain a certain degree of reputation by talking largely of principles which they conceived incorrectly in theory and could not apply at all." ² Men, like General Ruchel, who, at the battle of Jena, thought "that he could save the army by giving the command to advance the right shoulder in order to form an oblique line." ³ Clausewitz, a military philosopher, never completed his great work, which is little more than a mass of notes, a cloud of flame and smoke; still, he writes of the art: "The conditions have been mistaken for the thing itself, the instrument for the hand." ⁴ At length we come to Foch, the most eminent soldier of our period, who, in 1903, sets himself this question: "Can war be taught?" ⁵ He believes that it can be taught, but only as an art based on theory. He quotes with approval the words of Dragomirov: "First of all, *science* and *theory* are two different things, for every art may and must be in possession of its own theory, but it would be preposterous to claim for it the name of a science. . . . Nobody will venture to-day to assert that there could be a *science of war*. It would be as absurd as a science of poetry, of painting, or of music." ⁶

Surely it will not take more than a minute's thought to contradict this preposterous assertion. Poetry, painting, and music may be arts, but they are based on the sciences of language, of optics, and of acoustics. True, it is possible to be an artist without being a scientist, it is possible to theorize without knowing much, but this does not abrogate science, which, as I shall explain later on, is nothing else than true knowledge in place of haphazard knowledge, logical thinking in place of chaotic thinking, and, ultimately, truth itself in place of falsehood.⁷

¹ *The Art of War* (American edition, 1868), p. 360, also p. 344.

² *Ibid.*, p. 345.

³ *Ibid.*, p. 57.

⁴ *On War* (English edition, 1908), vol. ii., p. 130.

⁵ *The Principles of War* (English edition, 1918), p. 1.

⁶ *Ibid.*, p. 8.

⁷ The confusion between the meanings of science and art in the head of the average soldier is most pronounced. They do not understand that "a science teaches us to know, an art to do" (Archbishop Thompson, *Laws of Thought*, p. 10); or that, as Professor Gore writes: "Every art is founded upon science; thus we have the science of electricity and the arts of electric lighting, electroplating, etc., based upon it; the science of astronomy and the art of navigation dependent upon it; the laws of sound and the art of music. . . . There does not appear to be any real supernatural basis of any of the arts. Facts, laws, experience, and inference form the original source and foundation of all our knowledge, practice, and progress" (*The Scientific Basis of Morality*, p. 1). If an art is not based on science, then its foundations must be supernatural—that is, superrational. It is this alternative that such eminent soldiers as Marshal Foch have not considered.

Where are we to seek this theory of war which is unrelated to science? Foch answers: "History is the base," and then, approvingly, he quotes General de Peucker, who says: "The more an army is deficient in the experience of warfare, the more it behoves it to resort to the history of war, as a means of instruction and as a base for that instruction. . . . Although the history of war cannot replace acquired experience, it can nevertheless prepare for it. In peace-time it becomes the true means of learning war and of determining the fixed principles of the art of war."¹

But, if we are disallowed a science of war, we can have no *true* history of war, only a "terrible and impassioned drama." On the battlefields we are artists of war, but we are seldom on the battlefields, for the greater part of our lives is spent in preparing for war in our lecture rooms, our studies, and on our training grounds. Here we are confronted by the history and mimicry of war. We do not want drama; we want truth. We require not merely a chronology of past events, but means of analysing their tendencies—means of dissecting the corpse of war, so that we may understand its mysterious machinery. To deny a science of war and then to theorize on war as an art is pure military alchemy, a process of reasoning which for thousands of years has blinded the soldier to the realities of war, and will continue to blind him until he creates a science of war upon which to base his art.

THE REALITY OF WAR

What, then, is the reality of war? For answer we must examine history. Wars come and they go; like flesh wounds, they ache whilst they last, and then, when they are healed, mankind forgets their smart. It is well that man should do so, for pain is an unpleasant sensation, so unpleasant that when we are wounded we pay large sums to those who can rapidly heal us.

In the past we have possessed innumerable witch-doctors of war, but few true surgeons, because we have possessed no science of war. The cauldron of war boils over; we are scalded; we shriek; some die; some recover; and then we lick our wounds and wait until it boils over again. Believe me, the history of war is an unbroken relation of these Medean performances.

If the student doubts my words, then let him read the history of the Crimean War, and he will find that the horror of its trenches, like some tragedy from the Grand Guignol, is, scene by scene,

¹ *The Principles of War*, p. 7.

replayed sixty years later in the swamps of Flanders. Let him read the account of the massacre of the Prussian Guard at St. Privat, in 1870. What does the Duke of Würtemberg say? He writes :

During the action at St. Marie aux Chênes, Prince Hohenlohe, commanding the Artillery of the Guard, had collected 84 guns opposite St. Privat, and cannonaded the French position with great effect, at first at 2,640 paces, and afterwards at 2,000 paces. *About five o'clock in the afternoon the Commander of the Guard considered the enemy to be sufficiently shaken for him to risk an assault across the open and gently ascending ground. . . .*

"The effect of the enemy's fire, even at a distance of more than 1,500 paces, was so murderous that, according to the accounts received, nearly 6,000 men fell in 10 minutes, and the advance had to be immediately discontinued."¹

It is needless for me to remind the student that identical operations were carried out during the battles of Verdun and the Somme, forty-six years later. Forty-six years later! It is enough to make one weep!

Turn to the Russo-Japanese War: "At Shen-tan-pu the enemy made no less than five determined attacks against our entrenchment and its machine-gun, and were repulsed each time. The machine-gun did great execution, and we have heard—but this is not yet verified—that there were a thousand dead Russians left before it. At Li-ta-jen-tun the enemy could make no headway against our machine-guns, and was beaten back each time directly he tried to advance."²

Yet, in 1914, we had to learn the lesson of the machine-gun over again, and at what cost? We had to do so because war was looked upon as a dreadful drama, which required the most meagre of rehearsals for its preparation. "The truth is," writes Marshal Foch, "no study is possible on the battlefield; one does there simply what one *can* in order to apply what one *knows*. Therefore, in order to *do* even a little, one has already to *know* a great deal, and to know it well."³ With this I full-heartedly agree; but I am of opinion that we shall never arrive at understanding war—that is, *knowing it well*—until we have a science of war which will reveal to us its reality, and not solely an art which must of necessity deal largely with its appearances.

¹ *The System of Attack of the Prussian Infantry* (English edition, 1871). Quoted in *A Précis of Modern Tactics* (1873), Major R. Home, p. 75.

² *Reports from British Officers attached to the Japanese and Russian Forces in the Field*, vol. ii., p. 56.

³ *The Principles of War*, p. 6.

3. THE LACK OF THE SCIENTIFIC STUDY OF WAR

Though the scientific method has never as yet been applied to the history of war, truth always exists either openly or hidden ; consequently its discovery is not so much a matter of knowing that effect B follows cause A, but *why* it follows. Long before James Watt watched the steam in his mother's kettle lift the lid, innumerable men had watched a similar phenomenon. Long before Sir Isaac Newton saw the apple fall, millions of human beings had shaken apple-trees to make apples fall. Yet these innumerable men and millions of human beings were not scientists, though Watt and Newton were, and, through discovering the laws of motion and of steam-pressure, they discovered truths, not necessarily absolute, but sufficiently general to enable thousands of artists (artificers of truth) to make use of them and apply them in a million ways.

Throughout the history of war, in spite of many famous artists, we look in vain for a military Newton or Watt. So much so that we see such eminent soldiers as Dragomirov and Foch affirming that war is solely an art and that there is no science of war. I think that I shall be able to prove that they are wrong, and that, because of this very ignorance of a science of war, the art of war has remained chaotic and alchemical.

If I am doubted, then again must I ask the student to turn to military history, and not merely examine one or two incidents as I have done, but read and re-read the campaigns of the great captains and study the operations of the great fools, for not only are these latter folk in the majority, but their art is immensely instructive. What will the student's verdict be? I imagine that it will agree with mine: namely, that we soldiers are mostly alchemists, and many of us little more than military sorcerers.

In the Great War of 1914-18 many of us witnessed curious happenings. Many of us partook of strategical black masses and tactical witches' sabbaths. Many of us sought the philosopher's stone and failed, and how ignominiously few of us as yet realize ; for we, even to-day, possess no true test whereby to distinguish between the products of our ability and those of our incompetence. Be this as it may, do not let us despair of a little light, for as out of the twilight of the mediæval laboratory arose the great sciences of to-day, so out of this all but invincible ignorance may arise, if we so will it, a true science of war. It is for this reason that I have called this first chapter " The Alchemy of War," not because alchemy was utterly absurd, but because it was an art without a science. In alchemy what do we find? A false classification of real facts combined with inconsistent

sequences—"that is, sequence not deduced by a rational method. So soon as science entered the field of alchemy with a true classification and a true method, alchemy was converted into chemistry and became an important branch of human knowledge."¹ So also with war; true facts have been examined, but their values have not been understood; and it is with these values that I shall deal in this book.

4. THE OBSESSION OF TRADITIONS

It may be considered that I exaggerate the lack of war science in the past. Quite possibly I do; yet, outside the achievements of a handful of war geniuses, such as Alexander, Hannibal, Gustavus, and Napoleon, it is most difficult to arrive at the reasons of the military aims of the lesser captains. Either they set out to copy their masters, or else their battles were but matters of push of pikes, push of bullets, or push of shells. They were battles of imitation, or battles of brute force, and not battles springing from the foundations of a scientific knowledge of war. The main reason has been the obsession of traditions, for, as Sir Thomas Browne wrote in 1646, "the mortallest enemy unto knowledge and that which hath done the greatest execution upon truth hath been a peremptory adhesion unto authority and more especially the establishment of our belief upon the dictates of antiquity." In the opinion of this thinker, the universities, "though full of men," are oftentimes "empty of learning."

Marshal Saxe noted identical conditions in his day. Read his *Reveries*, and this is what he says:

War is a science so obscure and imperfect that in general no rules of conduct can be given to it which are reducible to absolute certainties; custom and prejudice, confirmed by ignorance, are its sole foundation and support.

It would be difficult to write more sarcastically. Then he continues:

Gustavus Adolphus invented a method which was followed by his scholars, and carried into execution with great success; but since his time there has been a gradual decline amongst us; which must be imputed to our having blindly adopted maxims, without any examination of the principles on which they were founded . . . from whence it appears that our present practice is nothing more than a passive compliance with received customs, the grounds of which we are absolute strangers to.²

¹ *The Grammar of Science*, Karl Pearson, p. 27.

² *Reveries upon the Art of War* (English edition, 1757), pp. iii., iv.

He suggested the reintroduction of armour, and he writes :

To say, then, that the enemy will adopt the same measures is to admit the goodness of them ; nevertheless they will probably persist in their errors for some time, and submit to be repeatedly defeated for years, before they will be reconciled to such a change ; so reluctant are all nations, whether it proceeds from self-love, laziness, or folly, to relinquish old customs : even good institutions make their progress but slowly amongst us, for we are grown so incorrigible in our prejudices that such, whose utility is confirmed by the whole world, are, notwithstanding, frequently rejected by us ; and then, to vindicate our exceptions upon every such occasion, we only say, *'tis contrary to custom*.¹

Such was the condition which prevailed before the Seven Years' War ; and of the French and English generals during this war the French officer who translated General Lloyd's book into French writes :

One must obey these old fellows who, never having studied their profession, obsessed by an antiquated routine which they call experience, and taking advantage of a long existence which they consider a long life, set out to traduce, pull to pieces, and ridicule budding genius which they detest, because they are compelled to value it more than themselves.²

Such was the condition during the Seven Years' War. What, then, was the condition which followed it ? To answer this question I will turn to another eminent soldier—Guibert—who, in 1769, published his *Essai Général de Tactique*, a book still worth studying. What does he say ?

Of all the sciences which excite the imagination of men, the one concerning which most has been written, but about which the fewest books can be read with profit, is without possibility of contradiction—the science of war. . . . How happens it that no book has as yet appeared in which is laid down the principles of war ? . . . I maintain that, from an instructional point of view, there scarcely exists a useful book on war.³

If these were the conditions which prevailed not only before but during and after the Seven Years' War, there can be little doubt, if we look back a few years, that they were the identical conditions which governed military thought prior to the Great War of 1914-18.⁴ From the point of view of the science of war,

¹ *Ibid.*, pp. 46, 47.

² *Introduction à l'Histoire de la Guerre en Allemagne*, Général Lloyd (1784), p. xii.

³ *Œuvres Militaires*, vol. i., pp. 129, 131, 135.

⁴ See *The Science of War* Colonel Henderson chap. xiv.

progress had to all intents and purposes been stationary. The Germans were copying von Moltke; the French were trying to discover how to copy Napoleon; we—it is difficult to say what we were doing; we certainly were watching these copyists, and our thoughts were probably controlled more by French than by German military opinion.¹

“The blind adoption of maxims.” In these words of Marshal Saxe may be summed up nine-tenths of the art of war.

Because of Sedan, fought in 1870, the Germans, in the next war, were going to repeat Sedan on a scale tenfold greater. Because of Jena, fought in 1806, the French, in the next war, were going to repeat that magnificent manoeuvre. Then, in 1914, before the war was six weeks old, these stupendous imitations dissolved into thin air.

The error here was not one of art—for the artist does a great deal of copying—but one of science, or, rather, one due to a lack of science.

Since 1806 and 1870 conditions had changed, and their values, which could easily have been ascertained by soldiers, were left undiagnosed, because armies were obsessed by traditions, and blindly adopted maxims.

5. THE FORESIGHT OF MONSIEUR BLOCH AND BARON JOMINI

It is always easy to be wise after an event, and, though this process must so often be resorted to, in the present instance I can quote from the written works of one man who, long before the outbreak of the Great War, because of his scientific training, was able to examine the nature of war scientifically. This man was not a soldier; he was a banker—Monsieur Bloch of Warsaw; and many soldiers thought him mad. In 1897 he published an immense work entitled *The War of the Future*; and in the introduction to the English translation of the first volume of this book we read:

At first there will be increased slaughter—increased slaughter on so terrible a scale as to render it impossible to get troops to push the battle to a decisive issue. They will try to, thinking that they are fighting under the old conditions, and they will learn such a lesson that they will abandon the attempt for ever. Then, instead of a war

¹ Robert Jackson writes of the copyists of his day: “Hence, whatever relative excellence may actually exist between Prussian tactic and the tactic of other nations in their intrinsic merits, the professed copyist is still a copyist—not likely to attain a name in war, while he moves undeviatingly in the trammels of foreign institution. The principle of imitation expels the desire of novelty; yet novelty and change of form produce impression; and impression is the cause of success in war. Imitation discourages pride; but pride of mind is the essence of military virtue (*A Systematic View*, etc., p. 201).

fought out to the bitter end in a series of decisive battles, we shall have as a substitute a long period of continually increasing strain upon the resources of the combatants. The war, instead of being a hand-to-hand contest in which the combatants measure their physical and moral superiority, will become a kind of stalemate, in which, neither army being able to get at the other, both armies will be maintained in opposition to each other, threatening each other, but never being able to deliver a final and decisive attack. . . . That is the future of war—not fighting, but famine, not the slaying of men, but the bankruptcy of nations and the break-up of the whole social organization. . . . Everybody will be entrenched in the next war. It will be a great war of entrenchments. The spade will be as indispensable to a soldier as his rifle. . . . All wars will of necessity partake of the character of siege operations. . . . Your soldiers may fight as they please; the ultimate decision is in the hands of *famine*. . . . Unless you have a supreme navy, it is not worth while having one at all, and a navy that is not supreme is only a hostage in the hands of the Power whose fleet is supreme.¹

This forecast of coming events, made seventeen years before their arrival, is one of the most remarkable in the history of war, especially so as it was made by a pacifist. Monsieur Bloch was, however, so influenced by his own particular outlook, his maxim that war had become impossible through having become unremunerative, that he was content to consider his prediction as final. Had he been a thoughtful soldier, and had he possessed experience in the art of war, having analysed the nature of modern warfare, he would have arrived, I imagine, at the following conclusion: What was it that prohibited movement? Fire-power! What would protect the soldier against bullets? Obviously, armour!

Here I will turn to another remarkable forecast made by one of the few really great military thinkers of the last century, namely Baron de Jomini. In his *Art of War*, written in 1836, this noted writer says:

The means of destruction are approaching perfection with frightful rapidity. The Congreve rockets—the effect and direction of which it is said the Austrians can now regulate—the shrapnel howitzers, which throw a stream of canister as far as the range of a bullet, the Perkins steam-guns—which vomit forth as many balls as a battalion—will multiply the chances of destruction, as though the hecatombs of Eylau, Borodino, Leipsic, and Waterloo were not sufficient to decimate the European races.

¹ *Is War now Impossible?* (English translation, 1899), pp. xvi.–lvi.

² This gun was invented by a Mr. Penn, and it was fired near the House of Commons to show the Duke of Wellington what it could do. I have as yet been unable to ascertain the date of this demonstration.

If Governments do not combine in a congress to proscribe these inventions of destruction, there will be no course left but to make the half of an army consist of cavalry with cuirasses, in order to capture with great rapidity these machines ; and the infantry, even, will be obliged to resume its armour of the Middle Ages, without which a battalion will be destroyed before engaging the enemy.

We may then see again the famous men-at-arms all covered with armour, and horses also will require the same protection.¹

The idea was excellent, but, at the time Jomini suggested it, it was quite impractical, for Jomini must have been fully aware that the main reason why armour had been discarded was that sufficiency of it could no longer be carried to protect the soldier effectively.

6. THE MILITARY MYOPIA BEFORE THE GREAT WAR

When Monsieur Bloch wrote his work on war the steam-engine had been brought to a high state of efficiency, and armoured traction-engines had already been built for service in Uganda, and, for tactical purposes, had been suggested as a means of destroying infantry in the Crimean and Franco-Prussian Wars. Further, the motor-car had just been born.

Now I maintain that had soldiers generally possessed the understanding to deduce the nature of the next war from existing facts—human nature as influenced by fire-power—as clearly as Monsieur Bloch had done, their answer to him would have been sought in the fulfilment of Jomini's prophecy.

Once it was realized that the unprotected infantryman could not face modern fire-power, then, knowing that half an inch of steel would stop a bullet, it needed but the most rudimentary common sense to see that armour should be reintroduced. As the horse and the man could not carry this armour, it would have to be carried for them. The only means of carrying it was some type of engine, and, as this engine would have to move off roads, it was clear that it would have to be furnished with caterpillar tracks.

Such machines were tested at Aldershot in 1907 and in 1908, but the military authorities could not see or foresee their use ; for, in spite of the Russo-Japanese War, they were obsessed by the idea of a war of movement, and, in their opinion, these machines were too slow for a galloping horse !

What did the soldier see in the next war ? A drama of glistening bayonets, a frenzied onrush of troops, a veritable Trojan

¹ *The Art of War*, pp. 48, 49. De Saxe and Henry Lloyd also recommended the reintroduction of armour.

contest. They laughed at Monsieur Bloch—the banker ; and thus it was how France saw the approaching Armageddon :

The war will be short and one of rapid movements, where manœuvre will play the predominating part ; it will be a war of movement. The battle will be primarily a struggle between two infantries, where victory will rest with the large battalions ; the army must be an army of personnel and not of materiel. The artillery will only be an accessory arm, and with only one task—to support the infantry attack. For this task it will only require a limited range, and its first quality must be its rapidity of fire, to admit of it engaging the manifold and transitory targets which the infantry will disclose to it. The obstacles which one will meet in the war of movement will be of little importance ; field artillery will have sufficient power to attack them. In order to follow as closely as possible the infantry to be supported, the equipment must be light, handy, and easy to manœuvre. The necessity for heavy artillery will seldom make itself felt ; at all events, it will be wise to have a few such batteries, but these batteries must remain relatively light in order to retain sufficient mobility, which precludes the employment of heavy calibres and powerful equipments. A battery of four 75 mm. guns develops absolute efficiency on a front of 200 metres ; it is consequently unnecessary to superimpose the fire of several batteries. It will serve no useful purpose to encumber oneself with an over-numerous artillery, and it will suffice to calculate the numbers of batteries that should be allotted to the organization of formations on their normal front of attack.¹

To-day, knowing what we do of the events of the Great War, it would be difficult to concoct, even as a joke, a more faulty appreciation, and when we compare it to the forecast of Monsieur Bloch, all we can do is to gasp !

What was the difficulty ? It was that soldiers possessed no means of analysing facts ; they saw things as cows see them, and they were unable to work scientifically. Had they been able to discover the true meaning—the truth—of facts, the rest of the problem would have all but solved itself.

7. THE MILITARY MYOPIA SINCE THE GREAT WAR

The Great War cost us nearly one million dead, and it was concluded by a series of peace treaties which reek with future wars, yet, if we went to war to-day, we should do so with an equipment in several respects inferior to what we had in November 1918. What, then, have we learnt from this great upheaval ? That war is such an unpleasant subject that the sooner we forget it the better ; and, to make peace with its reason, the nation

¹ *L'Artillerie* (1923), Général Herr, pp. 4, 5.

chloroforms its intelligence by inhaling catchwords and meaningless maxims such as "the war to end all war" and "the abolition of war," when such absurdities can only end common sense.

Sometimes I almost despair of the future. During the Great War we saw tanks winning through, tanks just out of the cradle, imperfect machines which seldom could move more than four or five miles an hour. These machines, little better than standing targets, were faced by hundreds of guns. To-day tanks have attained a speed of over twenty miles an hour; a British Division has but seventy-two field guns, and no infantry in the world will face a tank attack.

When, in our schemes and exercises, a battalion of tanks advances on a hostile division, that division, in spite of its seventy-two guns, is "dead meat" or "flying meat." Half the tanks may be put out of action, which is unlikely, nevertheless the remaining half will win the rubber. The reader may believe this or not, as he likes. All I can say is this: my opinion is based on the direct experience of at least a dozen tanks battles. In these battles I watched brave and efficiently trained troops—the German machine-gunners—literally melt away before tank attacks. In the future will infantry do better than they did, when faced, not by a machine crawling towards them at four miles an hour, but rushing on them at twenty-five?

Do we realize this? If we do, then, for some reason or another, we are afraid to express our convictions, for, in vol. ii. of the 1924 edition of that useful book the *Field Service Regulations*, we read:

Infantry is the arm which in the end wins battles. To enable it to do so the co-operation of the other arms is essential; separate and independent action by the latter cannot defeat the enemy. . . . The rifle and bayonet are the infantryman's chief weapons. The battle can be won in the last resort only by means of these weapons. . . . The Lewis gun is a valuable auxiliary to the rifle.

This may be true in mountainous or thickly wooded regions, but it certainly is not true of fighting in open country. In the great artillery battles of the last war the infantry merely walked behind the barrage, and when the barrage stopped they stopped—they did not conquer! In the great tank battles they merely walked behind the tanks, and when the tanks were knocked out, once again they stopped—they did not conquer! To lay it down as an official doctrine that infantry is the supreme arm in all circumstances, and that the rifle and bayonet are still the supreme weapons of war, is in my humble opinion a dangerous overstatement.

I write this with a clear and definite purpose, namely, that, in

spite of over four years of devastating warfare, few of us as yet have begun to realize the immense revolution which has taken place in the art of war. I believe that the main reason for this is that we possess no scientific method whereby to measure these changes.

In the past we have lulled ourselves to sleep on dogmas, and have been rudely awakened by realities which we have never troubled to foresee. Though we are soldiers, professing soldier-ship, most of us know no more about the science of war than a chimpanzee knows about the science of dynamics, though, as an artist, this brute excels in agility. It is for this reason that I intend to examine this subject ; not to thrust my opinions down the throats of my readers, but to appeal to their imaginations, so that, by understanding the value of their art, war may be rendered more effective in the future, and, perhaps, less and less a dreadful and impassioned drama, and more and more a just and righteous force.

8. OPPOSITION TO SCIENTIFIC PROGRESS

There are two main causes for this military shortsightedness : the first is the worship of traditions, and the second is our incapacity to see world forces in their true relationship.

As regards the first, those of us who dare to disturb the dusty shibboleths of the past must be prepared, as history shows, to fight a somewhat sanguinary battle. It is not physical but moral courage we require, and that in abundance. The discovery of truth calls for brave men, for truth gives nothing to cowards. In the past all scientists have been attacked as heretics, and why ? Because they were heretics. And not a few perished at the stake. When the stake had passed along its way, abuse and scorn replaced it, and to-day some of this former abuse appears so comic that I cannot refrain from quoting an instance.

Shortly after the Royal Society was founded a certain Mr. Crosse, vicar of Chew Magna in Somersetshire, declared it to be a conspiracy against both society and religion. " He regarded the use of the newly invented optic glasses as immoral, since they perverted the natural sight and made all things appear in an unnatural and, therefore, false light." He argued " that society at large would become demoralized by the use of spectacles ; they would give one man an unfair advantage over his fellows, and every man an unfair advantage over every woman, who could not be expected, on æsthetic and intellectual grounds, to adopt the practice."¹

¹ "On Some Aspects of the Scientific Method," F. Gotch. See *Lectures on the Method of Science*, p. 35.

Do we find such men as Mr. Crosse in the army? Yes—multitudes! He disliked spectacles; during the war I knew a major-general who was also an anti-optic fanatic; he disliked trench periscopes, and when, early in the war, a proposal was made to introduce them, he officially put down his objection on paper, and it read: "It is contrary to the traditions of the British officer to seek information from a position of security by means of a mechanical device"!

It is not the scientist but the alchemist who works like the natural philosophers mentioned in *Gulliver's Voyage to Laputa*. It may be remembered that one of these gentlemen wasted eight years of his life in attempting to extract sunbeams from cucumbers, in order to store them in hermetically sealed bottles and sell them during inclement summers. If for "inclement summers" we read "future wars," this method may equally well be attributed to the soldier.

As regards the second—our incapacity to see world forces in their true relationships—this fault has been not so much the soldier's as the civilian's. The civilian dislikes war, and he thinks that it can be killed by calling it by a bad name. Satan only exists when we believe in him. If we create a little hell and put war into it, it will take upon itself a hellish form, and, like a demon, it will annoy us. If, instead, war is looked upon as a world force, and we do not prejudice our views by calling it good or evil, we shall begin to understand it.

To-day it is pitiful to see the number of scientists, who pass as rational men, anathematizing war and urging men of science to have nothing to do with it. Their attitude is similar to that of the Church towards sorcery in the Middle Ages; and yet, when once persecution ceased, out of the witches' cauldrons bubbled the sciences of to-day.

To restrict the development of war by divorcing it from civil science is to maintain warfare in its present barbarous and alchemical form. To look upon war as a world force and attempt to utilize it more profitably is surely better. At one time, quite possibly, our ancestors were cannibals, yet hunger is not a vice, and even when a change over was made from eating vigorous young men and women to eating decrepit old people, this in itself was a distinct amelioration, which, in its turn, led to eating kids and lambs—yet hunger is still with us, and cannot be banished by a sigil or a decree. The moral needs no accentuation.

CHAPTER II

THE METHOD OF SCIENCE

Begin with observation, go on with experiments, and, supported by both, discover law and reason.—LEONARDO DA VINCI.

Must struggling souls remain content
With councils and decrees of Trent?

—LONGFELLOW.

I. AUTHORITY AND METHOD

LACK of science leads to chaos in art ; I hope that I have made this clear. We must possess an art of war, and the truer this art is the more effective will be our actions. To teach an art demands a method of imparting knowledge, and, as an army should work like one man, method must be based on authority. Here, then, is our first difficulty, for authority to-day is largely based on unscientific foundations. The solution to this problem lies in simultaneously destroying and recreating authority. Our work may be compared to a serpent sloughing its skin ; the old skin must not be torn off, but the process of forming the new skin must loosen the old and eventually detach it.

"Believe, and ask no questions," is the hub of a system which for many years I have fought against, yet the common mind asks for nothing better than to repose blindly in authority, and the common mind is not only to be found in the Higher Command, but in the rank and file as well ; in fact, our whole military organization is obsessed by a military scholasticism which closely resembles the religious scholasticism of the Middle Ages.

To the scholastic, reason was but the handmaid of faith—an *ancilla fidei*—and surely in the present-day military world reason is still little more than a handmaid, for belief in the written word and unwritten tradition is still the master.

To me, the comparison between the mind of a twelfth-century monk and a twentieth-century soldier is so remarkable that it may be of some interest, for a moment, to consider the opinions of a few of those eminent and courageous men who battled against the chill, crystalline doctrines of the Middle Ages.

Bacon urged that authority must be disregarded, consequently he strenuously attacked the method of his age.

Nor suffered living men to be misled
By the vain shadows of the dead.¹

Descartes, in his *Principia*, wrote : " The logic of the schools is only a dialectic which teaches the mode of expounding to others what we already know, or even of speaking much, without judgment of what we do not know."

Locke considered that scholasticism consisted in " empty verbalism and unverified assumption. . . . That every man may see things as they are, and not merely through the eyes of others, was his greatest wish." " Truth needs no recommendation," says Locke, " and error is not mended by it ; in our enquiry after knowledge, it little concerns us what other men thought."

To attack authority demands courage, but to replace the authority of assumption by that of reason demands a thinking man. The greatness of Bacon, of Descartes, and of Locke does not lie in their powers of destruction, but of construction. As Lewes says : " The special want of the age was a *method*, and these men furnished it." Therefore, as I consider that much of our present-day military theory savours of scholasticism, in order to follow in their footsteps I must also create as well as destroy, and if I only can create, destruction will follow as an inevitable consequent.

In this attempt to establish a method of studying war I realize full well that my machinery is imperfect ; my reasoning may be faulty and my knowledge defective ; I must ask, therefore, the student not to set authority lightly aside, but rather to rely on independent research in order that he may discover which is the more correct—authority or I. Research will lead to independence of thought, and this independence to an improvement of method—my own or someone else's. " It is not what the teacher does for the pupil, but what the pupil does for himself, that matters." This is the great lesson of Socrates, who suffered death because he was right and authority was wrong.

Before we cross swords with authority we must remember that an army is not a band of geniuses, but of ordinary normal men. Normal man, it should never be forgotten, is a product of fears and not of facts. He is a poor, receptive creature, obsessed by

¹ " Ode to the Royal Society," Cowley.

² *Scientific Method*, F. W. Westaway, p. 129.

³ See *Ency. Brit.*, xiv., p. 756.

prejudices and fearful of novelty and innovation. As one writer puts it, we are surrounded by a "monstrous regiment of old men. . . . We prefer old judges, old lawyers, old politicians, old doctors, old generals, and when their functions involve any immediacy of cause and effect, and are not merely concerned with abstractions, we contentedly pay the price which the inelasticity of these ripe minds is sometimes apt to incur."¹

All this and much else is due to normal men being in the majority. Their inclinations are static, and—I will repeat it again—an army is largely made up of such individuals, consequently power of judgment is never popular. This may be lamentable, but it is no use lamenting over it, for it is an irrefutable fact that the majority of mankind lives by imitation. Consequently the only common sense course open to us is to turn this limitation to our advantage by compelling men to imitate what scientific thinking has decided to be the most advantageous for a whole body of men, and not necessarily for each individual. In other words, we must discover and establish a common doctrine by a universal method. My object is, therefore, not to destroy authority, but to chasten it.

Method creates doctrine, and a common doctrine is the cement which holds an army together. Though mud is better than no cement, we want the best cement, and we shall never get it unless we can analyse war scientifically and discover its values. This, then, is the object of my method—to create a workable piece of mental machinery which will enable the student of war to sort out military values. Once these values are known, then can they be used like bricks to build whatever military operation is contemplated. My system, I believe, will enable the student to study the history of war scientifically, and to work out a plan of war scientifically, and create, not only a scientific method of discovery, but also a scientific method of instruction. Normal man *will not* think; thinking is purgatory to him; he will only imitate and repeat. Let us turn, therefore, these defects to our advantage; let us, through clear thinking and logical thinking, obtain so firm a mental grip on war that we can place before this unthinking creature a system which, when he imitates it, will reflect our intention and attain our goal. Let us look upon normal man as a piece of human machinery, a machine tool controlled by our brain. Let us devise so accurate a system, and let us present it to him in so simple a form, that without thinking, without perhaps knowing what we intend, he with his hands will accomplish what our brains have devised.

¹ *Instincts of the Herd in Peace and War*, W. Trotter, p. 87.

2. THE MEANING OF SCIENCE

Science aims at establishing the highest authority, and the man of science works by a well-defined method which is very different from the normal method made use of in the study of war, which, as I have pointed out, is similar, if not identical, to the method of the alchemists. I will now turn from this haphazard way of working to the scientific method, a system which, I think, will enable the soldier to evolve from the alchemy of war a science of war just as the science of chemistry was evolved from alchemy and kindred processes of work and thought. First, I will examine the meaning of science, for soldiers are so ignorant of the scientific method that I consider it wise to begin from the very beginning.

What is science? Science is co-ordinated knowledge, facts arranged according to their values, or, to put this definition still more briefly and to quote Thomas Huxley, science is "organized common sense," common sense being, in the opinion of this great thinker, "the rarest of all the senses."

"Wherever there is the slightest possibility for the human mind to *know*, there is a legitimate problem of science."¹ The result of this is that "There are no scientific subjects. The subject of science is the human universe; that is to say, everything that is, or has been, or may be related to man."² And, further: "Scientific thought is not an accompaniment or condition of human progress, but human progress itself."³

Bearing these facts in mind, it is beyond question that war, like all other human activities, may be examined scientifically, and it is in its examination, and not in what it may be in itself, that practical knowledge is to be sought, for it is a recognized fact that any branch of study "should be classed as a science, not in virtue of the nature of the things with which it is concerned, but rather in virtue of the *method* by which it pursues knowledge."⁴

In our study of war I maintain that our method has been a faulty one, and I maintain this, for in 1914 all armies were organically unprepared for war. These armies were not those which won or lost the war in 1918, and the difference between the tactical values of 1914 and 1918 is the measurement of the lack of scientific thought which characterized all armies before the outbreak of the war.

¹ *The Grammar of Science*, Karl Pearson, p. 17.

² "On the Aims and Instruments of Scientific Thought," W. K. Clifford, *Lectures and Essays*, vol. i., p. 141.

³ *The Grammar of Science*, Karl Pearson, p. 45.

⁴ "Psycho-Physical Method," W. McDougall, *Lectures on the Method of Science*, p. 113.

And how can science help us? What does it consist in? "It consists in strengthening, solidifying, and rendering conscious and coherent the ordinary processes of knowledge. The scientific man . . . claims to clear away fallacies, to bring into clear light the real principles by which all man's knowledge is acquired, and to use it."¹

We discovered no principles, though we were always using the word. We saw many things, but we failed to classify and to correlate them; we did not discover the laws which govern military activities. Above all, we failed to criticize our opinions, and without criticism our ideas on war were not subjected to that refining process, the struggle for existence.

I realize full well that, whatever science of war we develop, it cannot be an exact science. War is primarily concerned with human acts; every fact is a new fact, nevertheless it is related to an old one of a somewhat similar type. In the physical sciences, facts are potentially independent of particular place and time, but in the study of war, as in the study of history, this is not so, since the greatest difficulty is to fix the human element. The spirit of man moves here and there and changes the complexion and value of things, yet the science of psychology is little by little discovering the hidden machinery of human actions. It is for this reason that I shall so frequently refer to the human element, and it is for this reason that the whole of my theory of war is based on man.

3. THE METHOD OF SCIENCE

To me, all that I have said is included in Huxley's definition of science, namely, "organized common sense." And common sense, what is this rare quality? Common sense is thought sentiment, or action adapted to circumstances, and circumstances are those innumerable conditions which surround us, some of which are stable and others in a state of perpetual flux. To work scientifically is to work in a common sense manner; and theories which are not based on common sense can be founded on nothing else than common nonsense—a condition which has been most marked throughout the history of war.

The scientific method of discovery is the common sense method, and "the aim of scientific thought . . . is to apply past experience to new circumstances." Surely this also is our aim in the study of war? What we want to know is the truth about the past, and then how we can apply this truth to the conditions

¹ "Scientific Method as Applied to History," T. B. Strong. *Lectures on the Method of Science*, p. 231.

which surround us and which will probably exist during the next war. "The scientific method is in itself meaningless," writes Professor Gotch; "it acquires merit through its aim, and is significant because of its purpose. Its form may, and indeed must, be plastic, varying with the conditions of man and of nature, but its end remains throughout the same—the revelation of truth about things." In brief, and to quote Virgil, the aim of the scientific method is expressed in the following line: "*Felix qui potuit rerum cognoscere causas.*"

To know the cause, or, rather, reason, this is to begin understanding truth. In war there are, however, so many things, that it would seem almost impossible to know where to begin. Once science was faced by a similar condition; but the scientist did not stand gaping at this difficulty; he began to organize knowledge, and so to form a base from which others could work.

In the study of war we are not as fortunate, for no one has shown us how to organize the facts of war. Hitherto we have, as artists, studied the technique of war, but "while technical thought or skill enables a man to deal with the same circumstances that he has met with before, scientific thought enables him to deal with different circumstances that he has never met with before."¹

Here, then, is the supreme difference: If we can establish a scientific method of examining war, then frequently shall we be able to predict events—future events—from past events, and so extract the nature and requirements of the next war possibly years before it is fought.

The scientific method is, in my opinion, so important that I will quote what one writer says:

The methods adopted by science are to obtain and record the facts in connection with any subject, to marshal and classify them in their proper relationship, and then to make a generalization which, in a brief but comprehensive formula, endeavours to account for the association between them and also the phenomena of their existence. As new facts are discovered they can be classified in their proper relationship, and interpreted easily and quickly with great economy of thought, while the properties of new or newly discovered substances and the results of newly observed phenomena may be predicted with a high degree of accuracy by applying to them the generalization—the theories—already formulated.

But a fact which, seemingly, does not conform to the theory must be investigated further, or the theory must be discarded altogether in favour of a better generalization. The theory is the spirit of the fact, and must be in harmony with it.

¹ *Lectures and Essays*, W. K. Clifford, vol. i., p. 144.

It will be seen that science has no hard and fast line beyond which we must not trespass; the boundaries are constantly shifting with each new discovery, with more exact or more intimate investigation into phenomena, and theories are discarded unhesitatingly if the subsequent observations do not correspond with them.”¹

These, then, are the aspirations of the man of science: “He should deem no natural phenomenon too ignoble for investigation . . . he should grudge neither time nor labour in making and repeating observations and experiments . . . he should have the fear of error constantly before him, and . . . he should be unaffected by any considerations as to the immediate practical utility of his work. Free enquiry . . . conducted along these lines, guided throughout by man’s most priceless possession, reason, and illuminated by his gift of imagination, has advanced scientific knowledge in the past, and will surely continue to advance it in the future.”²

The whole of this method of science may be summarized in one word—“Experience,” and it is with this word that I will now deal.

4. OBSERVATION, REFLECTION, AND DECISION

All knowledge is derived from experience, which includes the process of reasoning and imagination from the moment a sensation is received by the brain to the moment it is stored away in the memory. First there is sensation which at once gives rise to reflection³; so to say, the mind manipulates the sensation and the result is a decision, either conscious or automatic, that is uninfluenced by the will of the recipient. Those sensations which are perceived I will call observations. These are at once followed by an inference. For example, I hear a noise, and at

¹ “Scientific Management,” H. Atkinson, *Engineering and Industrial Management*, vol. ii., No. 3, p. 71.

² “On some Aspects of the Scientific Method,” F. Gotch, *Lectures on the Method of Science*, p. 58. Plato defines a philosopher as “one who gets inside things and discovers the nature of their reality, and contrasts him with those who are content with mere appearances and with ready-made opinion” (*Scientific Method*, F. W. Westaway, p. 24). “The philosopher,” says Faraday, “should be a man willing to listen to every suggestion, but determined to judge for himself. He should not be biased by appearances; have no favourite hypotheses; be of no school; and in doctrine have no master. He should not be a respecter of persons, but of things. Truth should be his primary object. If to these qualities be added industry, he may indeed hope to walk within the veil of the temple of nature” (*Scientific Method*, F. W. Westaway, p. 49).

³ Sensation awakens mental feeling; reflection gives rise to ideas. The difference was realized long ago in Plato’s answer to Diogenes:

Diogenes: “I see a table and a cup, but I see no idea of a table or a cup.”

Plato: “Because you see with your eyes and not with your reason.”

once the nature of the sound heard suggests its cause. This is the beginning of reflection. I examine this cause, and it may appear to me unlikely, so I replace it by another, and ultimately arrive at a provisional decision. To prove this decision will demand a careful examination, not only of reasons, but of facts.

Experience may be said, therefore, to include three factors—observation, reflection, and their resultant, which is decision, the correctness of the sensation received being susceptible to proof by gaining contact with the cause of the sensation.

Accepting observation in its everyday sense, it is needless for me to say much, for its utility is self-evident. Some people are very observant, others see next to nothing; some only see small things, others only big, and most only see what others see, and what others see is very often not worth seeing.

The secret of observation does not so much lie in the quality of the thing observed, or in the quality of remembrance, as in the relationship of the thing to its surroundings at the moment of observation. To take a very simple example: a man on a cool day may walk twenty miles and show few signs of fatigue at the end of his journey; yet on a hot day he may show signs of collapse. The intelligent observer notices these two conditions, and, when he wishes to examine human movement, he remembers them as a relationship between human energy and temperature. The power of relating one thing to another is the foundation of reasoning.

Unless the student finds interest and is possessed with curiosity he will never observe. He will simply see things as a cow sees them, and, whatever grade he holds as a soldier, he will be but a military cow—every army is full of these beasts.

It is interest and curiosity which cause us to reflect, and if there is one word in the dictionary which is omnipotent it is the word WHY. Whatever I may say to the student, whatever he reads, whatever he thinks, he should ask himself the reason why. If he does not do so, however much he may strive to learn he will mentally be standing still. He must remember this: his brain is not a museum for the past or a lumber-room for the present; it is a laboratory for the future—a creative centre in which new discoveries are made and progress is fashioned.

Observation is the cause of reflection—that is, of reasoning—and it is only by reasoning that decisions are arrived at, and we must remember that a decision is something more than "Yes" or "No." If a judge were to omit taking evidence, and then say to the prisoner: "You are condemned," or "You are acquitted," he would cease to be a judge. When a general who has failed to reflect says to his subordinates: "You do this,

or that," he ceases to be a general and becomes a dangerous maniac. Do not let us delude ourselves into believing that noises made with the mouth are necessarily decisions, for a decision is the offspring of reflection.

Science begins with observation, but observation must be methodical before it can be classed as scientific. "Every great advance of science opens our eyes to facts which we had failed before to observe and makes new demands on our powers of interpretation."¹

5. ECONOMY OF RATIONAL THOUGHT

To cultivate the power of making sound decisions is no easy task. The biological process is that of trial and error, and this process results in adaption to environment and to evolution. The normal man works mainly by this process. He will watch others make a mistake a score of times, and then, in his turn, will make the same mistake. In fact, he learns next to nothing until he is made to suffer for his ignorance.

As man is the centre of the world of thought, and as thought governs action, and as it is visibly sound to economize the energy we expend, particularly during war-time, it stands to reason that we must begin by economizing thought. We must, in fact, establish an economical system of thinking before we can arrive at rapid and sound decisions.

"The method of trial and error is a perfectly valid and legitimate one; it works. But it is costly and wasteful. It is cheaper to be wise, if we can, before the event than after it. Rational thought is the human improvement on the biological method of trial and error; a perfected, economical, immensely more effectual form of it. If one course of action proves successful and another fails, *there is a reason for it*. If sufficient knowledge had been available, if sufficient trouble had been taken, it would have been possible to know beforehand which was the rational and which the irrational course. The successful result is that to which efficient thought would have led had it been applied."²

Foresight, or the power of arriving at values before actions take form, is the highest form of judgment. When this power is inborn it is called genius—a subconscious realization of true values. Genius can be cultivated in a synthetic form, and, though this synthetic "substance" will not sparkle with the lustre of the natural product, it is a tremendous asset. Napoleon,

¹ *The Grammar of Science*, Karl Pearson, p. 45.

² *The Making of Humanity*, R. Briffault, p. 55.

one of the greatest war geniuses the world has ever seen, once said to Baron Roederer :

“ If I appear to be always ready to reply to everything, it is because before undertaking anything I have meditated for a long time—I have *foreseen* what might happen. It is not a spirit which suddenly reveals to me what I have to say or do in a circumstance unexpected by others ; it is reflection, meditation.”

Meditation was the one great secret of Napoleon’s success, because meditation leads to rational thought, which within the sphere of rational things is always right. Rational thought knows no compromise or moderation, only the extreme view is right, because the ultimate extremity *is* truth. Thus, if I push a pencil off the table it will fall to the ground. This is a true fact ; there is no compromise or moderation about it. It is facts of this kind we must strive to attain in our studies.

What is the main difficulty in attaining to this logical process of thinking ? The difficulty is that we are slaves of the past ; like monkeys, we are obsessed by imitation, we are for ever copying thoughts and actions without weighing their values or considering their results. The majority cannot learn, therefore aim to be one of the minority. Primitive man does not think at all unless by the direst necessity he is driven to do so ; consequently do not hark backwards, look forwards. We must liberate our thoughts from customs, traditions, and shibboleths, and learn to think freely, not imitatively. When anything appeals to us or displeases us we must not accept it on its face value, but examine it, criticize it, and discover its meaning and inner worth. Remember that every student has much more to unlearn than to learn, and that he cannot learn freely until he has hoed the weeds of irrational thought out of his head.

6. THE MACHINERY OF RATIONAL THOUGHT

I will now turn to logic, or the machinery of rational thought, for, though I do not expect the student to study the numerous works written on the science of thinking, I consider that it is of importance that he should be able to recognize the leading methods.

When we think we are always inferring something—that is, making mental calculations. The first man who applied the scientific method to thought was Aristotle, who, in his *Analytics*, lays down three orders of inferences—analogue, inductive, and deductive. In the first order we infer from particular to particular, e.g. This thing has weight, so does that thing have weight.

If I say, however, that this thing has weight, so do all things have weight, I infer from particular to universal, and the process of thought is induction. If I reverse this, and say, As all things have weight, consequently this thing has weight, I infer from universal to particular, and the process is called deduction.¹

Comte, the French positivist, compressed the essentials of all logic into the following maxim :

"Induire pour deduire afin de construire."

In other words, in order to construct rationally we must first work inductively and then deductively.

In modern times the inductive, or experimental, method was first studied by Francis Bacon,² who, warned by the failures of scholasticism,³ propounded the following system :

- (i.) Collect, observe, and tabulate phenomena.
- (ii.) Note down all variations between them.
- (iii.) By a process of exclusion the cause of any given phenomenon is discovered.

In brief, by means of the inductive method we attain to science by collecting facts, by sorting these into categories, by extracting their values, and on these values erecting theories. By putting these theories to universal tests, by degrees we extract laws which form our working principles, our weights and measures of war.

What Bacon attempted in the physical sphere Descartes attempted in the intellectual. He writes :

Since we begin life as infants, and have contracted various judgments concerning sensible things before we possess the entire use of our reason, we are turned aside from the knowledge of truth by many prejudices ; from which it does not appear that we can be any otherwise delivered, than if once in our life we make it our business to doubt of everything in which we discern the smallest suspicion of uncertainty.⁴

To Descartes the ultimate basis of knowledge was his own consciousness, and his fundamental axiom was "*Cogito ergo sum.*" I shall in my turn attempt to propound a somewhat similar (military) axiom in my next chapter.

In the examination of any problem Descartes lays down four rules of procedure⁵ :

¹ "Induction is therefore the interpretation of facts, while deduction is the interpretation of sentences assumed to be true" (*Scientific Method*, F. W. Westaway, p. 171).

² See his *Novum Organum*.

³ A system of philosophy which in the main subordinated thought to clerical interests. It was based on the works of Aristotle. Its exponents used deduction as their process.

⁴ *Prin. of Phil.*, Descartes, i. 7.

⁵ *Discourse of Method*, Descartes, part ii.

- (i.) Never accept anything as true save what is evidently so.
- (ii.) Separate everything into its component parts—analysis.
- (iii.) Begin with the simplest components and work upwards to the more complex—synthesis.
- (iv.) Make certain that nothing has been omitted.

Though the following was written of Bacon's system, it may equally well be applied to Descartes'. The lessons are :

The duty of taking nothing upon trust which we can verify for ourselves ; of rigidly examining our first principles ; of being carefully on our guard against the various delusions arising from the peculiarities of human nature, from our various interests and pursuits, from the force of words, and from the disputes and traditions of the different schools of thought ; the duty of forming our conclusions slowly and of constantly checking them by comparison with facts ; of avoiding merely subtle and frivolous disputations ; of confining our enquiries to questions of which the solution is within our power ; and of subordinating all our investigations to the welfare of man and society.¹

If in the mental sphere induction consists in tabulating, evaluating, and excluding, in the physical sphere it consists of examining, experimenting, and constructing. The greatest scientist of the last century—Charles Darwin—worked by this method. In 1837 he began his work—the discovery of the law of natural selection. He writes :

By collecting all facts which bear in any way on the variation of animals and plants under domestication and nature, some light might perhaps be thrown on the whole subject. My first notebook was opened in July 1837. I worked on true Baconian principles, and, without any theory, collected facts on a wholesale scale, more especially with respect to domesticated productions, by printed enquiries, by conversation with skilful breeders and gardeners, and by extensive reading. When I see the list of books of all kinds which I read and abstracted, including whole series of Journals and Transactions, I am surprised at my own industry. I soon perceived that selection was the keystone of man's success in making useful races of animals and plants. But how selection could be applied to organisms living in a state of nature remained for some time a mystery to me.²

In 1838, due to a perusal of Malthus's *Essay on Population*, Darwin was inspired by the idea of a controlling law of selection. Between 1838 and 1842 he continued searching for facts, and criticized his hypothesis. In 1842 he put a brief abstract of his

¹ *Novum Organum*, Fowler, p. 129.

² *The Life and Letters of Charles Darwin*, vol. i., p. 83.

theory down on paper, but it was not until 1859 that he published his book, *The Origin of Species*.

In all, twenty-two years are spent in enquiry. First, facts are collected and examined; then a theory is propounded. This theory is subjected to prolonged criticism, and is eventually sufficiently proved to be classed as a law—the law of evolution.

I have quoted at some length the method applied by Darwin because I am convinced it is the model we soldiers should follow.

Induction is a simple and valuable process of reasoning, but, like all processes of thought, it has its limitations. In many subjects there exist too many alternatives for us to arrive at one universal, consequently the process of deduction from universals, either known or hypothetical, to particulars has to replace it. Professor Case takes, as an example, heat. In brief he says: “. . . by induction the nature of heat cannot be discovered. By the empirical method we know the phenomena of heat, and we know also that these are similar to the consequences of motion.” In other words, we infer the nature of heat, not by induction, but by that kind of deduction which combines “phenomena” with “laws.”¹

The value of deduction is that :

- (i.) It enables us to discover particulars inaccessible to the generalities of induction.
- (ii.) It brings inductive facts under principles and so enables us to reach further than induction.
- (iii.) It gives us greater power of discovering causation.²

In our study of war the deductive method will also help us, because we are confronted by innumerable facts the causes of which are generally unknown. Also it will help us, as it will enable us to make full use of our imagination—and this is essential in a science which is not an exact one, and which is interwoven so closely with the human element.

7. THE VALUE OF IMAGINATION

Imagination is the telescope of our minds. It gives us distant glimpses of great things which can be handed over to the reason to analyse. Imagination must be controlled by method and founded on fact, yet frequently it enables us to discover causes and effects which, at the moment, are not rationally linked one with the other. Imagination works by hypothesis—that is, by assumption. Professor Tyndall tells us :

¹ “Scientific Method as a Mental Operation,” T. Case, *Lectures on the Method of Science*, p. 12.

² *Ibid.*, p. 13.

Philosophers may be right in affirming that we cannot transcend experience, but we can, at all events, carry it a long way from its origin. . . . We are gifted with the power of imagination, and by this power we can lighten the darkness which surrounds the world of senses. Bounded and conditioned by co-operant reason, imagination becomes the mightiest instrument of the physical discoverer. . . . There is in the human intellect a power of expansion—I might almost call it a power of creation—which is brought into play by simple brooding over facts . . . the spirit brooding over chaos.¹

Newton passed from terrestrial to celestial mechanics. "In the language of Tyndall, this 'passage from a falling apple to a falling moon' was a stupendous leap of the imagination, for his enunciated law applies in conception to the universe, thus extending into boundless space and persisting through endless time."²

The hypothesis of the ether and the law of the persistence of force are stupendous assumptions, without which scientists could scarcely work. A hypothesis is not a vain speculation, for it must be based on facts and agree with their values. A hypothesis is a theory which binds facts together, a theory not only derived from the facts themselves, but also from their possible and probable conclusions. It is here that imagination based on reason comes to our assistance. Without some binding theory facts remain isolated and unfruitful; their contemplation should quicken the imagination; for, as Sir Humphrey Davy once said: "It is only by forming theories, and then comparing them with facts, that we can hope to discover the true system of nature." Professor Jevons lays down three constituent conditions of a good hypothesis:

(i.) A good hypothesis must allow of the application of deductive reasoning and the inference of consequences capable of comparison with the results of observation.

(ii.) A good hypothesis must not conflict with any law of nature which we hold to be true.

(iii.) In a good hypothesis, the consequences inferred must agree with facts of observation.³

In brief, the method of science is based on analysis, synthesis, and hypothesis, the one necessarily involving the other. We first observe; next we build up a hypothesis on the facts of our observation; then we deduce the consequences of our hypothesis

¹ *Fragments of Science*, Tyndall, vol. ii.

² "On some Aspects of the Scientific Method," F. Gotch, *Lectures on the Method of Science*, p. 54.

³ *Principles of Science*, Jevons, p. 510.

and test these consequences by an analysis of phenomena ; lastly we verify our results, and if no exception can be found to them we call them a law.

Without imagination the man of science lacks mental vision.

" All great scientists," writes Professor Pearson, " have, in a certain sense, been great artists ; the man with no imagination may collect facts, but he cannot make great discoveries." Imagination leads to " the discovery of some single statement ; some brief formula from which the whole group of facts is seen to flow is the work, not of a mere cataloguer, but of the man endowed with creative imagination. . . . The discovery of law is therefore the peculiar function of creative imagination. . . . Hundreds of men have allowed their imagination to solve the universe, but men who have contributed to our real understanding of natural phenomena have been those who were unstinting in their application of criticism to the products of their imaginations. It is such criticism which is the essence of the scientific use of the imagination, which is, indeed, the very life-blood of science."¹

If criticism is the life-blood of science, then of all the weapons in our mental armoury it is the most potent in our study of war. Hitherto (and still to-day) in our army criticism has been looked upon as a breach of discipline. To criticize the actions of a noted general, especially if he be alive, is considered derogatory to military etiquette, and the result is that without criticism there can be little or no progress, and without criticism strategy and tactics must remain alchemical arts. The man who cannot support criticism is a man who dares not look into the eyes of Truth. What did Cousin say ? He said :

" LA CRITIQUE EST LA VIE DE LA SCIENCE ! "

Let the student remember these eight words, and make them his guiding star in his study of war ; and, if he be wise, let him remember also the words of a still greater man—Galileo :

" WHO IS WILLING TO SET LIMITS TO THE HUMAN INTELLECT ? "

The man who does petrifies his brain.

¹ *The Grammar of Science*, Karl Pearson, pp. 37, 38.

CHAPTER III

THE THREEFOLD ORDER

The general order, since the world began,
Is kept in nature, and is kept in man.—POPE.

There is but one temple in the Universe,
and that is the Body of Man.—NOVALIS.

I. THE FOUNDATIONS OF KNOWLEDGE

IN the first chapter of this book I showed, and I think beyond dispute, that it was not so much the lack of knowledge, but of method in its examination, which has rendered the study of war so chaotic. Now if, before applying the method I have summarized in the last chapter, I can establish a foundation so universal that it may be considered axiomatic to knowledge in all its forms, then, not only shall I be able to work from a solid base, but I shall be able to bring the study of war into the closest relationship with the study of all other subjects. If this foundation is so layed out—as I believe it to be—that from its outline can be perceived the form and proportions of its eventual superstructure, then I shall possess a guide towards design and a key-plan to work by.

In the examination of these foundations I must, perforce, enter into a little elementary philosophy, since philosophy embraces universals, but, in so doing, I intend to establish my base in as simple a manner as I can, since my object is to assist military students and not philosophers.

The first question which confronts us is : What is the ultimate source of knowledge ? My answer is : For a moment let us look around and think, and we shall soon realize that the world as it appears to us is unceasingly surging from rest to activity, and from activity sinking back into a state of restfulness. We sense a continuous, never-ending pulsation. What, then, is its rhythm ?

Complete inertia and absolute activity are unthinkable qualities, and whether the world is evolved from a single source or from two or more separate sources does not concern us here, since thought cannot penetrate beyond duality. For a thing to exist

within the limits of our consciousness, which is the relationship between the ego and the non-ego, it must possess two opposite poles or extremities. Both these poles are in themselves incomprehensible, for the only factors which the mind can grasp are the relationships between their differences.

The nature of all knowledge is, therefore, relative; that is to say, it is only the record, or a reflection, of the interplay between the differences of these two poles, and this relationship is a dual one. Thus, if I am represented by A and the universe by B, the relationship between myself and the universe is subjectively + AB, and objectively — BA. A does not exist apart from B, neither does B exist apart from A, nor can their relationships exist apart from either, since all three exist as a trinity in unity, and it is this triunity which enables us to know. Knowledge is, in fact, based on the universal inference of a threefold order—this is my *cogito ergo sum*.

Having established this hypothesis, I will now attempt, not to prove it, as it must always remain an assumption, but to render it more tangible.

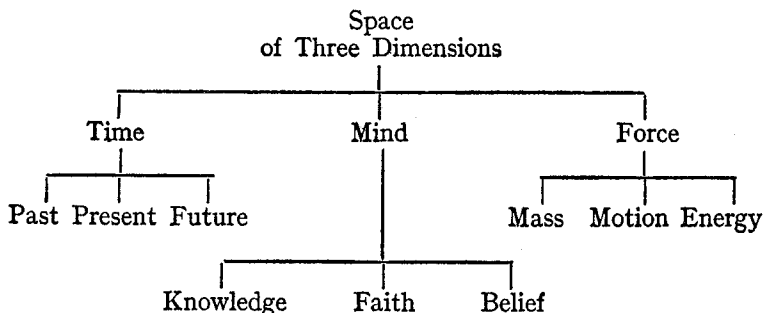
If I look upon the universe as space of three dimensions, then this space manifests to my mind in terms of time and force; time including the subjective relationships of mind and space, and force—the objective relationships. Time may be divided into past, present, and future; and force into energy, motion, and mass. We only know the past through the present, and can only speculate as regards the future from the present; and all our subjective knowledge in time is ultimately based on objective motion, or the relationship at any given moment between energy and mass.¹

Because of the mind, about which we practically know nothing, we become conscious of the present and of motion, and through the present of the past, and, to a lesser extent, of the future; and through motion of mass, and also, I think, to a lesser extent, of energy. When some event happens again and again, we infer that it will happen yet again, and this inference, when we have discovered the reason why it happens, we call knowledge; or, if we are not certain of the reason, we assume that it will happen again, and this assumption we call belief. The relationship between knowledge and belief I will call faith, and if knowledge is A and belief is B, then faith may be either A—B or B—A. Whatever metaphysics may demand, what scientific faith requires

¹ When we think of time as eternity—that is, timeless time—or space as vacuum—that is, space devoid of matter—we are only thinking in abstractions rendered possible by what I will call common sense time and space, that is, time which to the human mind is never fixed and space which is never empty.

is that A should be as great and B as small as possible—yet there must always be some B.

I will now set down my argument in graphic form:



Reason ultimately is based on an assumption; therefore, strictly speaking, all knowledge is assumed. Common sense accepts this situation, nevertheless the common sense thinker differentiates between assumptions; he knows that he knows more about the past than the future, and about mass than about energy, and that the first two are realizable in what he calls the present, and the second two in what he calls motion. In the past and in mass he finds something concentrated and tangible, and in the future and in energy, something distributed and less easily grasped.

If we now turn to mind, it is scarcely necessary to explain that knowledge is mainly the product of analysis, and assumption of hypothesis, and that faith is the synthesis resulting from the relationship between these two. Faith is our directing force; I have faith in my knowledge or my belief, and thus faith is my guide through life.

I hope that this brief examination has made my meaning of the threefold order clear, an order which flows like an electric current between the poles of inertia and activity, and which is measured in terms of change. The human mind deals with change—changes of motion in an ever-changing present, and the terminals in themselves remain unknowable. The world as it appears to us is, therefore, but a reflection of the world as it is in itself, and, as absolute knowledge of the world is not vouchsafed to our reason,¹ consequently all our knowledge is but relatively true, as true when compared to the Absolute as my

¹ William James writes: "The 'absolutely true' meaning what no further experience will ever alter is the ideal vanishing-point, towards which we imagine that all temporary truths will some day converge. It runs on all fours with the perfectly wise man and with absolutely complete experience, and, if these ideals are ever realized, they will all be realized together" (*Pragmatism*, p. 223).

reflection in a mirror is true when compared to myself. In the mirror my left side becomes my right ; in Reality it is possible that my inside (centre) becomes my outside (circumference), and that things can be known centrally and not merely circumferentially.

To pursue this question further would be to digress, for the subject before me is common sense knowledge and not metaphysics. We live in a three-dimensional world, and our knowledge is based on a threefold order. There may ultimately be an absolute plus and an absolute minus, a complete state of activity and of inertia. We cannot, however, grasp these states, but only the changes in the current which flows between them. We start from some conventional zero, and, by working upwards or downwards, we give plus and minus quantities a measurable meaning—that is, a relationship within our minds.

This threefold order surrounds us at every turn. Not only do we live in a three-dimensional world, but we think three-dimensionally and our thoughts reflect a threefold order. We sense ourselves as mind, body, and soul, and the world as force moving through space. We talk of God, Nature, and man ; all our religious ideas are ultimately based on a trinity, as are those of all but the crudest of cults. We see Nature as earth, water, and air, and mankind as men, women, and children. We are surrounded by solids, liquids, and gasses, and by birth, life, and death. We live in a perpetual twilight, that infusion of light and darkness which in themselves are, to our minds, zero—that is, they are incomprehensible. This threefold order I believe to be the key to the understanding of all things ; it is my postulate.

This threefold order forms the axle-pin of my system, which, I hope, will enable the items of war to be more readily evaluated than heretofore. In this system, in place of making use of the term inertia, I shall generally talk of stability. To me stability denotes resistance, and activity opposition to resistance—that is, pressure. The changes, or movements, between these two are the resultant of their co-operation. Thus, if I wish to break a stick, I place it across my knee and pull it towards me. The stick is possessed of stability, my muscles of activity, and the relation between these two—the tension, the strain, and the ultimate snapping of the stick—is the movement generated by the co-operation between the resistance of the stick and the pressure exerted by my muscles.

Whether this threefold order is a universal law I am not prepared to say, but as it forms the norm of my entire system, if it is overlooked, the system itself will be difficult to understand. I will now turn to the brain of man—the storehouse of knowledge.

2. THE STOREHOUSE OF KNOWLEDGE

Knowledge is a brain culture and not a world culture, and the brain, like a heat-engine, cannot work without a relationship between two differences. I have already stated that thought cannot penetrate beyond duality, consequently without duality it is not possible to conceive of reason, which is the relationship between mind and the outer world, or between mind and mind, or between the thoughts within the mind which the outer world has forced the mind to store. These relationships constitute knowledge, which is piled up in the mind in the form of accumulated mental work or mental energy, the economical expenditure of which is the most important problem in war, as it is in all the other activities of life.

The actual storehouse of knowledge is called memory—conscious or subconscious. Then, when the mind mobilizes its thoughts, the threefold order takes form, and the thread of plus quantities is woven through the woof of minus quantities; thus are ideas formed and decisions arrived at.

This storehouse is filled by study, by experience, and by information. One of our main sources of study is history, in which is collected the past experience of others. To read history is not sufficient, for history is full of assumptions and errors; therefore, unless we can deduce the reasons for these assumptions and evaluate the events recorded, and apply these reasons and values to our present and future problems, our reading will be of little use. In place of reading history we must study it—that is, we must think over the relationships between the items which go to build it up, and from observation and reflection arrive at a decision regarding them. Locke, very truly, says: "Reading furnishes the mind only with materials of knowledge; it is thinking makes what we read ours. The memory may be stored, but the judgment is little better, and the stock of knowledge not increased, by being able to repeat what others have said."¹ We must work on a system! To-day we have no system, and it is my intention to create one.

I will now examine experiences which simultaneously possess great values and dangers. Their main values are those of a mental rather than of a physical character, and especially so in war. Thus, it is not so important to realize the physical results of certain actions as it is to know the state of mind which was induced by them during their execution. The reason for this is a simple one, and I will explain it by an example.

There is no difficulty in understanding the protective value

¹ *Conduct of the Understanding* section xx.

of an artillery barrage, but, to those who have never experienced walking behind a "wall" of bursting shells, it is next to impossible to realize what it morally "feels" like. Again, anyone can picture to himself the physical effect of machine-gun fire; but in peace-time it is not practicable to experiment on human nerves by actually firing at a human target. We thus find that, to those who work alchemically, experience is generally a danger rather than a blessing. Whilst *matériel* is always changing, nerves remain constant, or nearly so, consequently the most permanent lessons the experiences of war should teach us are those of a moral nature; yet in peace-time these are the more rapidly forgotten, since we possess no system which will balance the mind.

The dangers of war experiences are to be sought in their novelty and vividness; they are apt to obsess an unbalanced mind and leave it spellbound. We see something accomplished which leads to success or failure, and we judge of it by results, with little reference to the circumstances of the moment, which frequently are unknown to us.

In war nothing is more dangerous than jumping to conclusions on isolated actions, or of basing a theory on a single success or failure. What proves a success in one set of conditions may well prove the greatest of failures if these conditions be slightly shuffled. This fact history bears record to again and again, so frequently that it may with truth be said that a common cause of disaster is the copying of methods which in the past have proved themselves successful. Again we arrive at the necessity for some system which will enable us to correct our thoughts and discover the true meaning of events and experiences.

Lastly, as to information, which is the contact of mind and mind, and not of mind with the other world, or of thoughts within the minds. Here we are presented with knowledge in the second degree. In war we have largely to rely on information, consequently if the two minds be differently trained, as they usually are, and if they are collecting knowledge on a different system, or, what is more often the case, on no system at all, values will become mixed, and time will be wasted in untying these mental knots. To take a simile, each brain is constructed to resemble a photographic camera; but, unless each camera is in focus, the negatives will not be similar. That this focus seldom exists in the untrained mind is readily proved by the proverbial unreliability of eye-witnesses, and the history of war is largely built up on their evidence. Yet I believe that, if observation is systematized, reliability can be established; and, if reliability is attainable, reflection can be simplified and truer decisions arrived

at. Here again we require a system, and one which will not only train men to see the things they are required to see, but to think of them from a common basis.

I will assume that potential knowledge in its totality is unlimited, or so vast that at present man's brain has only rendered a fraction of it conscious. By inference we assume that a few years hence our knowledge will be greater than it is to-day. Progress means stepping forward, therefore past knowledge is our base of action from which with some assurance we can attack our ignorance and transform it into knowledge. Thus our present knowledge becomes our means of action as well as our stable base, and if this knowledge is systematized so that we can correctly analyse past knowledge, by turning our minds forward and by making use of this same process, we are able in many cases to predict the nature of future discovery, and so advance in our knowledge more rapidly than if we leave discovery to chance.

Given the threefold order as a guide, the question now arises : Is there any prototype which will provide us with a key-plan to work to? I believe there is.

3. THE ARCHITYPAL ORGANIZATION

To me the one great measuring-rod is the body of man, for, with Protagoras, I believe that : "Man is the measure of all things." All the knowledge we gain is through our minds, toned by our souls and expressed by our bodies. All the change we effect and the inventions we introduce are made to assist and enlarge our natural abilities. The world which man knows is of his own creating. Everything he thinks and does is measured out in proportion to his natural powers ; in fact, the world *he knows* is a radiation of himself. The illusion is that he does not realize this, and, when he beholds the world he has created, he thinks of it as something apart from himself, and then he attempts to organize it on lines which do not reflect his measurements. Nevertheless, in spite of this inverseness, his world and his work are always tending to approximate in organization to his own body, which is the most wonderful and perfect machine devised, a fitting temple for his intelligence to inhabit.

Though human inventions and discoveries astonish us daily, the body of man still remains the most wonderful piece of automatic machinery in the world, and for many centuries yet to come will man's mind be concerned in examining its works. The most mysterious of events which daily takes place is the procreation of life, and the workshop of life is so marvellously

organized that to overlook it as a model is to me all but a blasphemy.

Whatever we are asked to organize, we should think in terms of the human body, for as the world is a reflection of Something on the mind, so should all human organizations reflect the threefold order in man.

4. THE THREEFOLD ORGANIZATION OF MAN

I will now take man as my model and examine him in a common sense way, a way which can be employed by anyone, even if his knowledge of physiology be of the slightest.

First I see man as an object—a *body*; then I find that this body is not inert, but conscious; it possesses a *brain*; and then somewhere in man lives his *soul*, or *ego*, which, by endowing him with character, differentiates him from his fellows.

Once again are we confronted by the threefold order, and, bearing this in mind, I will now turn to the human body and examine it. What do I find? That it is based on a threefold organization: it possesses structure, and powers of control and of maintenance. Thus:

(i.) *Structure*. The body, as we see it, is a compound of bones, ligaments, and muscles. The bones give stability to the whole organization; they keep it erect and in shape. Without bones man would be but a human jelly-fish. The ligaments bind bone to bone and muscle to bone, and enable the muscles to work or co-operate with the bones. The muscles give flexibility to the whole organization, yet their activity would be negligible if they were deprived of the bones upon which their actions are based.

(ii.) *Control*. The body is controlled by the brain, one part of which automatically governs the internal organs, and another part consciously regulates the limbs and external organs—eyes, ears, etc. Its functions largely depend on the information gathered up by the senses, and conveyed to it by the nerves, and also by means of the nerves it regulates the movements of the body.

(iii.) *Maintenance*. The body is maintained by the internal organs, of which the power-house is the stomach. Here energy is distributed to the body by means of the blood; and the tissues are repaired, and the waste products collected by various organs and ejected.

If, now, from the apex of this organization we look downwards, we shall see that each main organic division possesses power of

action which is expressed by co-operating with a stable base and working from it. Thus :

- (i.) In the structure of the body :
 - (a) The skeleton is the stable base.
 - (b) The muscles possess power of action.
 - (c) And the ligaments enable activity to become manifest by linking muscles and bone in close co-operation.
- (ii.) In the control of the body :
 - (a) The senses form the stable base, or source of information.
 - (b) The brain possesses power of action.
 - (c) And the nerves enable activity to become manifest by linking brain to muscle in close co-operation.
- (iii.) In the maintenance of the body :
 - (a) The stomach forms the stable base, or source of supply.
 - (b) The repair and evacuative organs possess power of action.
 - (c) And the blood enables this activity to become manifest by linking the stomach to all parts of the body in close co-operation.

I realize that these deductions are in nature very general, but, if they are moderately correct, we may, I think, from the body of man abstract three qualities, or elements, namely :

- (i.) The element of stability (the negative element).
- (ii.) The element of activity (the positive element).
- (iii.) And the element of co-operation (the relative element).

These three, when correlated, build up the human organism.

The aim of every living thing is to continue to live, and this object is striven after through the closest possible interplay between the above three elements. Power to move cannot become manifest unless it is based on a stable foundation, or frame, and linked to this frame by the element of co-operation. Granted this link, movement takes place when the stable and active elements are in co-operation ; man is, in fact, a human engine which can move from place to place or stand still at will.

5. THE THREEFOLD NATURE OF MAN

The brain of man is the controlling organ of his anatomy, yet it is not a free agent, for its control is accelerated and retarded by what I have called the soul of man. The brain of man is continually being bombarded by impressions, and the soul of man is the focal point of this bombardment. Each of these

impressions changes man, and not only his mind, but his character. Though I cannot here enter, even superficially, into the values of normal psychology, I consider it of importance that the threefold nature of man should be realized, since wars, like all other human activities, are matters of men and the wills of men in harmony or in opposition.

Man is a compound of soul, mind, and body, three modes of force which must be expended, controlled, and maintained in war. I will now briefly examine these forces.

(i.) *The Soul of Man.* Every living organism, however primitive it may be, possesses feeling, or power of becoming aware of itself as an existence apart from its surroundings. When an outer object is brought into contact with it, a feeling or sense-impression is produced, and a sensation results which, according to its quality, the pleasure or pain it stimulates, becomes a desirable or undesirable sentiment. Should this sentiment become fixed through repetition, it is called habit ; if through hereditary action, instinct. The strongest instinct evolved by natural selection is the instinct of self-preservation.

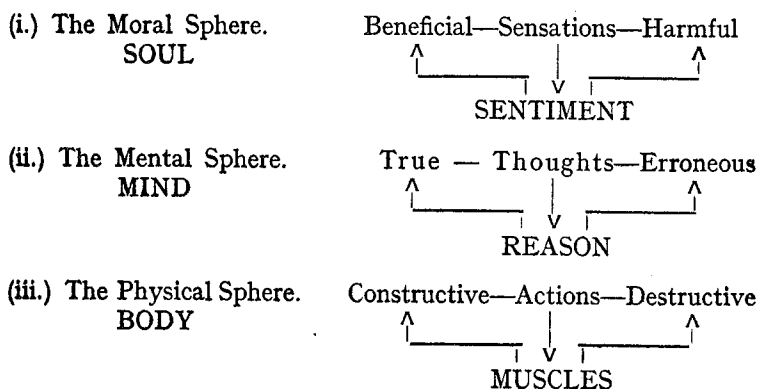
(ii.) *The Mind of Man.* Each sense-impression leaves on the substance of the feeling a trace, or mark, which is retained by a quality of the mind known as the memory. The interplay between memories results in thought and between the ideas in imagination. The interplay itself is known as the understanding, or the power of tracing causation ; and the faculty which renders this interplay possible is the reason. Reason is the faculty of thinking ; and when thoughts are fixed in one direction by a conscious impulse the result is will—the motor-force of the organism which produces it.

(iii.) *The Body of Man.* Will, once set in motion, is directed by purpose, and leads to a definite act, which is the material or outer effect of the psychological or inner cause. The immediate agent of this act is the body, and particularly the movements engendered by the muscles. These movements may be classified under two headings : voluntary, or conscious movements, and involuntary, or subconscious. Subconscious movements are of two kinds : instinctive movements, such as that of a newly born child seeking its mother's breast, and acquired movements, such as a man guarding himself in fencing.

From this brief summary it will be seen that man is possessed of three spheres of force ; his mind works in the mental sphere, and his soul and muscles in the moral and physical spheres respectively. This may seem a very obvious discovery, and one

of no particular importance. It is, however, one of the greatest importance, not that I have discovered anything—I have not—but what is of importance is that later on I am going to apply this discovery to war. Whenever I think of force, I am going to think of it in terms of these three spheres of force, which are a trinity and, consequently, can never be separated.

If this brief examination of the threefold nature of man is accepted as being correct, then it follows that, because man, in common with all other animals, possesses a quality called feeling, which is susceptible to sensation, sensations become the source of all knowledge and of all moral characteristics. In the mental sphere a sensation takes the form of thought, which is a reflection of the object sensed. In the moral sphere it is the quality of each sensation which endures, and not its form. Whilst thought is controlled by our power of reasoning, which may lead to true or erroneous decisions, sensations are moulded by our power of sentiment into pleasurable and painful qualities; normally the first are beneficial and the second harmful to the health of man. A mental decision leads to a physical action, actions being the concrete and tangible manifestations of our thoughts. Actions may be constructive or destructive, the controlling power being our muscles. We thus obtain three spheres of force, which diagrammatically may be shown as follows :



The problem throughout life is how to control these three spheres.

6. THE THREEFOLD ORDER OF MAN'S ACTIVITIES

I have now extracted from the organization of man three abstract quantities, or elements—namely, stability, activity and

co-operation ; and from his nature, three spheres of force—the mental, the moral, and the physical. In these three spheres the elements are ceaselessly at work, spinning as it were the life of the individual. I will now enquire into this phenomenon.

We frequently hear the assertion made that man has a right to live. In spite of the humanitarians, natural man, I hold, has no right to live, but, possessing power to protect his life, his might becomes the right to safeguard it. This power is manifested through movement, so once again we find a threefold order, namely :

- (i.) Desire to protect life.
- (ii.) Power to work or to fight.
- (iii.) And ability to move.

The first is man's stable base, the second his active, and the third his co-operative, element.

Possessing power to move, he is enabled to work, and, through work, to protect his life by supplying himself with food, warmth, and shelter.

Whether we examine man as a highly cultured being or as a primitive savage, we find these elements in constant operation through co-operation, always present, and only varying in degree. In highly civilized communities work takes many forms, mental as well as physical, altruistic as well as egoistic, but it still remains work. Social rights are evolved from customs, and, to the common eye, a moral right to live is established, and yet is safeguarded by the power behind this right as manifested in the law and the police and soldiers behind the law. Thus, if we examine the structure of even the most highly civilized society, we shall find that moral power is based on physical power, just as it is in man. Further still, that moral power is established as a means of economizing physical power, so that human activity is not only expended in safeguarding the individual, but in securing the community, as well as increasing the general prosperity of peace.

From the individual man I will now turn to a group of men—a tribe, community, or nation. Here we find no radical change, only a difference in degree.

In a primitive society each man has to work for himself, and he carries a weapon to protect himself, consequently the rise of culture is slow, as the nation is literally a nation in arms. It is here that the establishment of a moral right comes to his assistance. Man has to work and to fight, but the less frequently the workers and fighters coincide the better it will be for the

community as a whole, and the better it is for the community the better it is for each individual composing it.

The community, or State, as an abstract conception, stands between work and fighting, and manifests in the form of order. We thus obtain three national elements :

- (i.) Protection, which is the stable element.
- (ii.) Industry, which is the active element.
- (iii.) And tranquillity, which is the co-operative element.

The first is the basis of military power, the second of economic power, and the third of ethical power. These are the three great political forces of a nation, of which military power is the base of all action ; for by this power law and order are enforced, taxes are collected, communal expenses are paid, and the taxpayers, being freed from protecting themselves, can expend their energy on fostering prosperity, and the community as a whole is safeguarded against invasion.

The more prosperous a nation becomes the larger can be its armed forces ; and the stauncher is the will of the people the more powerful do they grow. We thus see an intimate relationship between the nation and its fighting forces, which grows closer and closer as national power expands. The link between these two is government. Thus we get another expansion of the threefold order. During peace-time the armed forces are the stable element and the nation the active, and during war-time it is the reverse, for then the nation becomes the base of military action. Meanwhile, during both these periods, the government is the co-operating link which endows the one or the other with an increasing or decreasing mobility.

As primitive society is based on brute force, so also is civilized society, for armed force not only secures the nation against internal discord and external injury, but it enables its government, during peace-time, to enforce the will of the majority of the people on the minority, and also on foreign nations, by a threat of the application of physical force ; consequently we find that an army is possessed of a threefold purpose :

- (i.) It maintains domestic tranquillity by force.
- (ii.) It maintains national security by force.
- (iii.) And the link between these two is moral persuasion through the threat (and ability) to apply force.

I have now established, or attempted to establish, three leading ideas. The first is that man himself is organized on a

threefold order, the second is that he is the product of a threefold force, and the third is that his activities may be summarized in three great divisions. We thus obtain a human instrument charged with power which is expended profitably or unprofitably, according to the object in view and the degree of knowledge possessed in its economy.

With a nation it is the same ; for the society which man creates is but a development of his threefold organization, nature, and activity in a higher and more complex form.

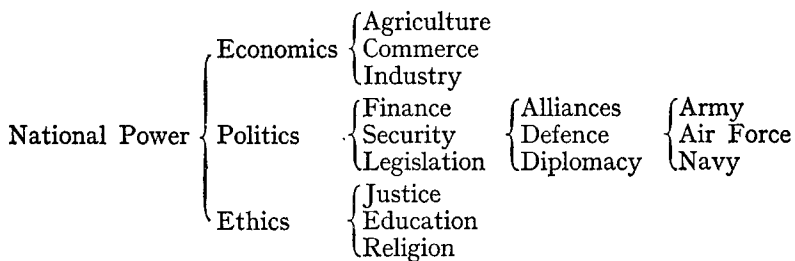
In this society armed force finds its place, and, drawing its power from the nation itself, it consequently stands in close relationship to all the national activities, and through them back to the threefold organization of man.

I will now examine this relationship in order that it may be seen where armed force enters into the national scheme.

For a moment I will return to man. He has a soul, mind, and body, interwoven and interfused. In a crowd of people the mind, as a controlling organ, ceases to operate, and the soul of each individual merges into what may be called the spirit of the crowd ; instinct, in fact, replaces reason. To obviate this chaos, a nation either submits to the will of one man or to a body of men directed by one man ; thus a political control is established which regulates the relationship between the body and soul of the nation.

Thus, if the idea of a crowd of men is replaced by that of co-ordinated national power, this power may be divided into a threefold order. From the national body is derived the economics of the nation, from the national soul its ethics, and from the national mind its politics.

Diagrammatically this may be shown as follows :



Security is the pivot around which the whole system revolves. It guarantees finance, which links government to national economics ; it also secures legislation, which links government to national ethics. It is not purely military, for alliances and diplomacy are bracketed with defence. The defence section

is the one which mainly concerns us, and to-day it is threefold, since air-power has been added to land- and sea-power. Each of these three major arms is composed of men, and in war each is ultimately controlled (or should be) by one man, all the remaining men being the vehicle which expresses the will of their respective commanders, who draw their inspirations from their government, which co-ordinates and controls the power of the nation. A nation built up of human cells, each slave to its instincts, and yet controllable through its faith, which is child of its knowledge and beliefs.

CHAPTER IV

THE OBJECT OF WAR

The legitimate object of war is a more perfect peace.

—GENERAL SHERMAN.

The legitimate object of peace is a more perfect man.

—ANONYMOUS.

I. THE FOUNDATION OF WAR

THE world is not governed by reason, but by the law of causation, or of uniformity ; that is, similar causes produce similar effects. Without this law, which in itself is an assumption, as all laws formulated by the human mind must be, the scientific method would be impossible, in fact, it would possess no base wherefrom to operate.

If the student will now turn to the opening section of the last chapter he will see that the mind working within the trinity of space, time, and force realizes its surroundings in the forms of knowledge and belief, and that the intensity of either of these realizations constitutes faith, or the intellectual egoity of the subject. If this faith is firmly based on a close relationship between law and objective facts, it assumes a scientific character, but if on a relationship between assumption and subjective longings, then an unscientific one. The alchemical attitude is, as I have shown, a half-measure between these two, for it is a mixture of subjective desires and uncorrelated objective facts.

Turning now to warfare, I will substitute war for space. War is the area in which the soldier must work, and the history of war may be compared to time and military power to force. History is the record of time, or, rather, of the events which take place in time ; it has its past and present, and, speculatively, its future. Military power, like force, is a compound of mass (body) and energy (activity), which expresses itself in the form of movement throughout its three spheres—the mental, moral, and physical.

In this new trinity I will place the mind, and we at once see that its operations are similar to those obtained in the original trinity.

By observing the facts of war, not only as they go to build

up military power, but as they have gone to build up military history, and continue to build it up at the present moment, we obtain knowledge of cause and effect. At first our premises may be hypothetical—that is, we believe that some theory is correct, or subject to probf; secondly, we actually prove it, and only accept the result when we are as certain as we can be that our reason for acceptance is no longer subject to exception. Such reasons constitute true military faith.

This, then, is the difference I am attempting to establish between the system I am now expounding and most of the systems which have preceded it: My military faith is based on an examination of facts correlated by the scientific method; the faith of the military schoolmen is based on unexamined, or badly examined, facts and assumptions. The struggle is between the adherents of two faiths, consequently it is likely to be a long one.

2. THE BIOLOGICAL CAUSES OF WAR

When the man of science has established a relationship between cause and effect, and has thus given expression to a reason, he is in possession of a fact worth knowing. The soldier, if he aims at working scientifically, must follow suit, and the first fact he must establish is the cause of war; for the cause of a war will produce its effect, not only during the war, but in the peace treaty which will follow it. Unless we understand the causes of a war, it is unlikely that we shall, from the outset, be able to formulate the object of the war, the attaining of which will lead to the effect required.

In human affairs it is mind which replaces law, and, though mind and law should be correlated, we cannot doubt that mind possesses freedom of choice—that is, it can disobey laws as well as obey them; and between these two, obedience and disobedience, lies the entire sphere of life as we know it. By obeying we utilize, and are rewarded; by disobeying we waste, and are punished—punishment is the measure of our error. Let us, therefore, obey, and obey knowingly and not blindly, for blind obedience is to reduce ourselves to the position of a stone unconsciously drawn towards the centre of the earth by gravity.

Fights are the concern of individuals and small groups of people; wars are the concern of nations; yet wars are built up of fights; consequently I will examine the causes of war, first from the standpoint of the individual, and secondly from that of the nation.

The strongest instinct in man is that of self-preservation, and I am of opinion, as I stated in my last chapter, that, because of

this instinct; man possesses a natural and indisputable right to protect his life, not on moral, but on physical grounds, because he possesses the might to do so. This instinct is the keystone in the struggle for existence, which may, I think, be accepted as one of the main causes of evolution. To mitigate this struggle mankind establishes moral conventions and rights, but in wars for existence these conventions are set aside, and the contending nations become primitive savages, using the whole of their might—physical, moral, and mental—to preserve their national independence.

From the outset a point I want the reader to realize is, that in this struggle there is no essential difference between peace and war. The differences are purely relative. The essential is that might, or human energy, “demands action”; all action is struggle, and “every action is a conflict,” and, as one writer says: “To put an end to conflict is impossible. Life is a conflict. As long as it lasts conflict will endure.”¹

To return to man. Another writer tells us that “Children do not fight because they are teased, they tease in order to fight,”² and a little observation will assure us that this is generally true. The same author writes: “Fighting play, therefore, prepares the young animal, not to attack feebler species which are to serve as his food, nor to resist stronger which covet him as prey, but, above all, to measure himself against other individuals of his own species”; because “It is to struggle for a female, rather than for food, that the young are being unconsciously rehearsed. . . .”³

If this statement be accepted as correct, then there is not only what I will call a military cause for fighting—that is, self-protection—and an economic cause—the search after food—but also a biological cause—the survival and improvement of the race. Turning to national life, the normally healthy nation does not only fight another to exterminate and plunder, or to prevent itself being exterminated and plundered, but to establish or maintain its ideal state of peacefulness. The animal man fights for a mate, the social man for peacefulness. Woman rears the family, peacefulness rears the State. The biological cause thus passes into the ethical cause—the maintenance of peace—and the same energy which is expended in the establishment of peace is utilized to preserve and to secure it. I think, therefore, that William James is right when he says:

Every up-to-date dictionary should say that “peace” and “war” mean the same thing, now *in posse*, now *in actu*. It may even

¹ *Courage*, Charles Wagner, p. 193. ² *The Fighting Instinct*, P. Bovet, p. 53.

³ *Ibid.*, pp. 45, 46.

reasonably be said that the intensely sharp competitive *preparation* for war by the nation *is the real war*, permanent, unceasing; and that battles are only a sort of public verification of mastery gained during the "peace" intervals.¹

We thus obtain three fundamental biological causes of war: security of life based on the instinct of pugnacity; maintenance of life based on the instinct of hunger; and continuity of race based on the instinct of sex. The first is the mainspring of the military cause of war; the second of the economic cause; and the third of the ethical cause.

3. THE NATIONAL CAUSES OF WAR

If the reader will now turn back to the final page of the last chapter he will see that these causes of war are closely related to the threefold order of national power, the only difference—and this is purely one of degree—being that in an organized nation military power is replaced by political power. As I say, the difference is only one of degree, for political power, just as much as military, is based on brute force, the ballot taking the place of the bullet.

From the three spheres of national power emanate three great groups of causes of war. We have at first those of race, of education and religion, which give us ethical causes; secondly, those of commerce, industry, and supply, which lead to economic causes; and thirdly, those of geography, communications, and fighting strength, out of which evolve military causes.

Racial causes are ever present, and yet are difficult to fix. Accepting nations as great groups of individuals, a more pronounced hostility exists between them than between the individual members of each group. In Europe, for centuries we watch an undying enmity between Teuton and Latin and between the Nordic and Mediterranean races, due, no doubt, to the fact that their psychological outlook is different. These racial differences are accentuated by religion and education, for, whatever the origin of a religion may be—and most are Oriental, and consequently foreign to European culture—in place of assimilating race psychology they are assimilated by it, until out of one root can sprout three such different trunks as the Catholic, Greek, and Protestant Churches.²

Economic causes are also fundamental. Each nation, like each individual, desires prosperity, and if a nation be strong it

¹ "The Moral Equivalent of War," in *Memories and Studies*, W. James, p. 273.

² The cradle of a nation is frequently an internal religious war.

will attempt to gain it. In former days plundering was a cause of war, now it is commerce, and the difference is again only one of degree. The acquisition of undeveloped lands in order to obtain raw material, the control of markets where manufactured goods can be profitably sold, and the command of communications, especially those of the sea, to assure the safe passage of raw and manufactured materials, are all potent economic causes of war.

Possessed of a high ethical and economic power, a virile nation very naturally determines to secure itself from either internal or external interference. This search after security is the most potent of the military causes of war. Internally, during peacetime the nation is an entrenched camp. The will of the majority, enforced by the national Government, maintains a state of peacefulness by force, for this will is backed by military power. Externally—that is, against neighbouring or competing nations—this will can only exert its power indirectly by threat of force, and when two nations threaten each other, however amicably, the desire for security leads to the search after strong or unattackable frontiers. I will take a simple example.

A man, before retiring to rest, bolts the windows and locks the doors of his house, and, if he lives in a lawless country, he may place a revolver by his bedside. The outside walls of his dwelling are his frontiers, the bolts and locks are the fortresses blocking the natural avenues of approach, and his revolver is his field army. From the individual I will turn to the nation. The stronger its walls and frontiers are, the securer it will be. If they are weak, fortresses and field armies must be increased. The wise man builds a strong house, so also does the wise nation, and if the nation be powerful, and yet possesses weak frontiers, it will seek to strengthen them as surely as a rich man will refuse to live in a barn if he can obtain a brick mansion. This, then, is the point we must grasp: every healthy nation which possesses the power to establish strong frontiers will attempt to do so, either by occupying natural features which will strengthen them, or by creating weak neighbours who dare not cross them. An examination of history will show that this is so, and that the search after strong frontiers in order to secure peacefulness is a fundamental cause of war.

These three great groups of causes produce their effect through political action which, by concocting a pretext, detonates the war. In wars between great democratic nations it is the nations themselves, and not their Governments, which are responsible for war. The politician may hasten or retard the outbreak of a war, but unless the causes are potentially in the soul of the nation a great war is impossible.

This is the point which is nearly always missed or glossed over by pacifists and humanitarians. Because in domestic affairs the ballot has replaced the bullet as a means of expressing force, they assert that a similar moral equivalent for war can equally well be established between nations. In this assertion there lurks a deadly fallacy.

In all democratic countries the might of the majority makes right. No court of justice can reverse the decisions of the ballot-box, for such a reversion is only possible through the will of the majority, or a revolution in which the minority succeeds in imposing its will on the majority. Whilst in a nation a moral equivalent for war has been discovered, none has so far been found between nations. Arbitration cannot settle international political questions of importance. Because no court of justice can settle political questions within nations, so equally can no court or commission settle international political questions between nations. As Colonel Vestal says :

You will find that in every nation in existence to-day the right to declare war is lodged, for all practical purposes, in a body which has power to raise and support armies and navies and to raise revenue to carry on war. . . . You can never take from the Congress of the United States its power over the sword and give it to an international body, unless you give the international body the power to tax us to pay for making war. Manifestly we will never do that. . . . If it were possible to establish an international legislature which had power to make war and unlimited power of taxation, the ballot would, of course, become the moral equivalent of war for settling political questions in the world state. The most enthusiastic internationalist, however, has never proposed a real legislative union of the world.¹

To-day, from their major point of view, Leagues of Nations are leagues of nonsense, as they cannot control the causes of war. The only factor which throughout the course of history has done so with any success is what is called the balance of power, which aims at meeting pressure by resistance. In the past, this balance has only been completely upset when the aggressor has simultaneously possessed command of the land and command of the sea. How far command of the air will complicate this balance I cannot discuss here, but the past tells us this—that as long as one power is supreme on the sea and another on the land the conquest of the world—or known world at the time in question—is not a feasible operation.

¹ Lecture given in February 1923 on "The Maintenance of Peace." See also Colonel Vestal's book, *The Maintenance of Peace*. Curious as it may seem, such a union was the ultimate aim of German world-power in 1914.

4. THE OBJECT OF WAR

From the causes of war I will now turn to its object, aim, or purpose. First it should be realized that its object is closely related to its causes. In its most condensed form the cause of war is discontent with the existing conditions of peace, but, as the nature of peacefulness is complex, so out of this one cause, as I have shown, evolve three great groups of causes, and, when once war is declared, each of these groups is confronted by a correlated group of objects, the gaining of which will remove the discontent which has led up to the war.

The object of a nation as a self-governing unit is prosperous racial survival, and to all individual and family requirements must be added the need of co-operation between individuals and families as well as self-sacrifice for the common or co-operative good. For a nation to survive it requires :

- (i.) Self-sacrifice leading to ethical superiority (culture).
- (ii.) Control leading to political stability (order).
- (iii.) And co-operation leading to commercial prosperity (comfort).

The three, conjoint, constitute the means of maintaining the object of a nation which, when given expression through its Government, constitutes its policy, the maintenance of which is the object of political control.

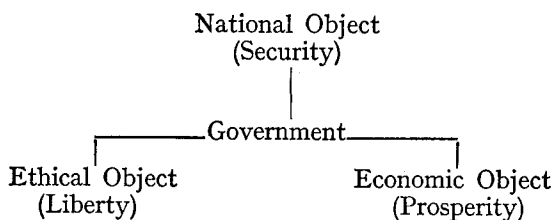
In order to maintain, protect, and enforce policy, all civilized countries raise armed forces, the object of which is to maintain domestic peace and to secure the nation against foreign invasion and diplomatic threat.

As the policy of a virile nation is to enforce its will on its antagonist, the sooner it can do so the less commercial capital will it expend, and the less disorganization of existing markets, whether in its own hands or in those of its enemies or allies, will result. In wars originating in economic causes the object is not to kill, wound, or plunder the enemy, but simply to persuade him, by both moral and physical pressure, that acceptance of this policy will in the end prove more profitable than its refusal ; for to kill, wound, and plunder is to destroy or debilitate a future buyer—it is, in fact, a direct attack on the competitive impulse which is the foundation of prosperity.

From wars arising from military causes, frontier security, etc., it is much the same. The object is to remove the military threat with as little injury to the hostile nation as is compatible with its attainment. In wars arising from ethical causes, such as the loss of independence, of ideal, or of religious freedom, unfortunately it is otherwise, for the objective aimed at is intangible ; it

is not a frontier or a market, but an idea ; hence it happens that the most ferocious of all wars are civil wars and wars originating from religious causes.

To return to the object. The nation replaces the man, its ethical outlook—the soul : its economic wealth—the body ; and its political system—the mind. We thus obtain a close coincidence between the nation and its ultimate units—the men and women who go to build it up. The object of man is to live, and to live contentedly and prosperously ; similarly, the object of a nation is to exist, and also to exist contentedly and prosperously. The brain of man is his controlling organ ; so also is the Government the national organ of control. Diagrammatically we obtain the following :



I will now consider these three objects from the point of view of war.

5. THE NATURE OF THE NATIONAL OBJECT

Both in peace and war, the backbone of a nation is its racial character. This backbone supports its civic body and forms the base of operations for its military limbs. In war, as in peace, the character of the nations competing form the foundations of their policy, diplomacy, and effort. Character is the sun which lightens the whole horizon of endeavour ; glowing with racial instincts, its rays are received, refracted, or obscured by local customs and traditions, which lie deeper than intellect or reason. In normal circumstances its full powers remain eclipsed, and they are, consequently, difficult to appreciate, but as it is so often the event which reveals the man, so also, in great national crises such as war, the character of a people assumes its full and inherent form, and manifests as the light and leader of the nation.

This is undoubtedly so, consequently it is during great wars—struggles for existence—that character attains its most tangible form, and reveals itself in the will to win or to accept defeat. If the war be unimportant, its loss may not materially affect the nation ; nevertheless, it will be a blow registered against its

prestige, its moral capital, on which so much of its material prosperity is based. Its credit will be lowered in the eyes of others, and a series of such blows may exhaust the national *moral* to such an extent that the will of the nation is laid bare to a knock-out blow.

If the war be important, victory becomes vital, and the nation, subconsciously realizing this, sets about to divest itself of the formalities of everyday life. Traditions, customs, and party aims are, one by one, discarded and replaced by common sense actions, and, as this process grows, the great static and foundational racial spirit reveals itself, and a nation, according to its character, stands or falls.

National solidarity is a psychological and not a physical phenomenon; further, wars between democratic nations are not originated by pushful or piqued individuals, but by the nations themselves. It is, therefore, the nation which is the true aggressor, its Government being but its trumpet. It is the national will to win which must be broken, consequently it is this will which forms the basic military objective in war, the object being its conquest.

Once this will is broken the war is won; but, in the breaking of it, it must be remembered that the enemy's Government should not be bereft of its domestic powers, or else the enemy will be bereft of his national brain. The attainment of the national object aims at an agreement and not at a mental disruption of the hostile nation. To reduce a nation to a state of idiocy or of anarchy only means that it will be deprived of the power of fulfilling its contract—the terms laid down in the peace treaty. And if these terms are not fulfilled, then, from the point of view of policy, the war will, to a great extent, have been fought in vain; for policy should aim at attaining a more perfect peace than the one unhinged by the outbreak of hostilities. Conversely, the contract must be reasonable; for to compel a beaten foe to agree to terms which cannot be fulfilled is to sow the seeds of a war which one day will be declared in order to cancel the contract. Thus the national object is a better peace, and the means of attaining it is the conquest of the will of the hostile nation.

6. THE NATURE OF THE ETHICAL OBJECT

The attainment of a better peace demands a higher ethical outlook. This brings me to the ethical object of war, which is the enhancement of the national character—to increase its prestige, not only in the opinion of the enemy, but in that of all

other nations. A man who fights cleanly is always applauded, even if he loses ; consequently, in certain circumstances it is even more important to win the ethical object than the military object. To be proclaimed an international cad in the world's opinion is equivalent to being regarded as such in the public eye.

Chivalry, in the broadest meaning of the word, is the cultivation of respect in an enemy for or by his opponent. Outstanding acts of courage, of courtesy, and of humanity give birth to a feeling of superiority or inferiority, according as one side excels or falls short of the other. This feeling of superiority, of *noblesse oblige*, is purely ethical, yet it forms the foundation of the physical superiority which war demands. The side which first attains a superiority in chivalry is the side which attains a moral victory over its enemy—a victory which frequently not only precedes physical success, but which wins the ethical object of the war, which is the true foundation of the peace which follows it.

War in many respects is comparable to a game. It has its rules, which are elastic enough to be of general application ; but there is this difference, that whilst in a game the referee is represented definitely by a third party, in war he is only represented by the conscience of the combatants themselves as influenced by the ethical opinion of neutral States. In wars other than world wars this opinion has a profound influence on the behaviour of the combatant nations, but in world wars it ceases to hold sway, since no nation of importance remains neutral. The referee removed, the result is that the war rapidly develops into a cad's struggle, the low ethical tone of which becomes clearly apparent in the peace treaty.

Though in wars of all types there is no belt which may not be hit below, nevertheless a wise fighter will think twice before hitting below a certain moral line, because the material advantage accruing may be cancelled out by the ethical loss resulting.

These high ideals must not, however, blind us to common sense. Men who take on the nature of vermin must be exterminated, and in their extermination the entire moral progress of mankind is moved one step nearer to its final and unknown goal. To refuse to use brutal means against a base foe is to set a premium on crime, and in war there are crimes as well as honours. To tolerate crime is neither to act chivalrously towards a criminal nor chivalrously towards oneself ; it is the act of a fool—that is, of a man who values his self-preservation at the price of a custom which, ceasing to be marketable, has become counterfeit.

Ultimately it must be remembered that, on account of the intricate economic relationships existing between civilized

nations, great wars are becoming more and more world wars, and as the victor in a great war will, in the peace which follows final victory, exert a higher influence on civilization than the vanquished, it is an advantage to the world as a whole that the cleanest fighter wins. Consequently, to fight cleanly is to be supported by what is righteous in the world's opinion.

7. THE NATURE OF THE ECONOMIC OBJECT

In its ultimate form the economic object in war is the national object, namely, survival with profit, which presupposes an ethical outlook, since honesty endows prosperity with its firmest foundation. If this objective is to be attained in a full degree, then the peace which follows a war must at least be as prosperous as the peace which preceded it, for prosperity is the material dividend of victory.

I can, I think, explain this more clearly by returning to my example of a duel between two men. Economically, it is not sufficient for the victor to kill his opponent, for he must secure himself against being so badly mauled that at the conclusion of the struggle he is left permanently crippled. Further, should his opponent be his buyer, and should the quarrel have arisen over a question of barter, economically the objective will not be gained by destroying his adversary, for this very act will defeat the end in view. Rather should it be sought for through disarming him, which will enable such terms of peace to be dictated as will compel him to sell and buy at values which are economical to the victor.

If a man be fatigued or in poor health his muscular endurance will be low, he will be lacking in staying power ; if the reverse, his staying power will be high, for it will consist of that surplus of muscular energy which is not actually required for the maintenance of his daily existence. The amount of this staying power can never be excessive, and the skilful fighter, knowing this, is most careful in its expenditure ; in fact, he realizes it economically ; that is, he attempts to spend less energy in proportion to his efforts than his adversary, and yet by doing so gain equal, if not superior, results.

To-day industrial endurance forms the staying power of war, and, as it can never be excessive, a wise Government should see that during war this wealth is squandered neither by civilian nor soldier, and that war expenditure is remunerative in the fullest meaning of the word, namely, that it could not have been more profitably spent.

As in the individual the staying power for war is measured

in terms of surplus muscular endurance, so in the nation is it measured in terms of financial endurance, which represents the surplus productivity of the nation's work. Accumulated wealth or money has, therefore, been rightly termed "the sinews of war," and if this be realized it will at once be seen that the economic object in war does not only consist in destroying the enemy's strength, but in destroying it with profit. If this is done, then peace will find the victorious nation in a superior position to that in which it was on the declaration of hostilities. It can then not only gain an advantage over the vanquished, but can compete with all other nations.

On first thought it may be considered that this is not a question which concerns the soldier, but solely the financier and politician; but, on second, I think it will become readily apparent that, unless the soldier understands the true meaning of the economic object, he has no right to complain if politicians and financiers, and these two always run in harness, attempt to direct a campaign so that its cost does not permanently cripple the nation.

8. THE POLITICAL OBJECT

These three objects—to exist, to exist honourably, and to exist profitably—are, or should form, the directing forces of political power. A nation, like any crowd of individuals, is inarticulate without a leader or a national assembly, because it is controlled by instincts and not by reason. Its government, whatever form it may take, is its thinking organ, drawing its sensations from the nation, and converting these into reflections, and from reflections into decisions, and, lastly, actions.

Unfortunately, to-day, governments generally work on lines just as alchemical as military organizations; and, though innumerable books on political science have been written, governments do not carry out their work on scientific lines. In place of mastering their environments, they, more often than not, are mastered by them, and especially so if these environments are those of war.

Lord Morley once said that politics were neither a science nor an art, but a dodge. This is very true of politics to-day; consequently, when in war, the military alchemist is controlled by men whose upbringing has been one of dodging difficulties in place of conquering them, the result is frequently disastrous.¹

¹ Edward III, in 1372, to facilitate parliamentary procedure, forbade the election of lawyers; in 1404 Henry IV did the same, and the result was the "Unlearned Parliament," which justified the King's action, as it got through a great deal of work.

If, as I have attempted to show, it is necessary for soldiers to understand the nature of the causes of a war, since these are closely related to its objects, how much more so is it necessary for politicians to understand them, since they represent the national will which so largely creates these causes. This understanding or misunderstanding, as the case may be, is expressed consciously in the policy of the government. Policy is, in fact, the relationship between will and surroundings expressed in words. On one side of the politician stand the esoteric instincts and desires of the nation, and on the other the exoteric facts of life—these it is his duty to correlate.

Domestic policy, *per se*, is the national purpose derived from the correlation of all the qualities and quantities which go to build up the national, ethical, and economic objects, but it never can be considered *per se*, since each nation is part of the world, and to-day, on account of the interfusion of ideals and of wealth, not only a national but an international part. Whatever influences a great democratic nation influences the whole democratic world, mentally, morally, and physically. We no longer live in the period of isolated national shocks, but of ceaseless international repercussions. Thus we find that domestic policy must, in its turn, be correlated with the policies of all other nations—hostile, neutral, and friendly—and that out of this grand correlation springs foreign policy.

In the main, the object of policy is first to maintain and enhance the general prosperity of the nation, and secondly to secure it against internal and external interference. The problem of war is, consequently, always present, and the political object in peace or war is a more perfect peace. If this object is not attained, then, though the war may not have been fought in vain, it will not have fulfilled its highest purpose, which is to create a better state of conditions, and not merely to destroy an existing discontent.

Power to wage war should, therefore, be looked upon as a creative force, and not merely as an insurance against calamity. To-day this outlook on war scarcely exists, and, in my opinion, it will never exist until a science of war has been established, by which the conception of war may be correlated with our conceptions of all other human activities.

All honour is due to Clausewitz for having made clear the relationship of policy and war. "We maintain," he writes, "... that war is nothing but a continuation of political intercourse with a mixture of other means."¹ And again: "We see, therefore, that war is not merely a political act,

¹ *On War*, Von Clausewitz, vol. iii, p. 121.

but also a real political instrument, a combination of political commerce, a carrying out of the same by other means . . . for the political view is the object, war is the means, and the means must always include the object in our conception. . . . State policy is the womb in which war is developed, in which its outlines lie hidden in a rudimentary state, like the qualities of living creatures in their germs."¹

Yet what little attention does the politician give to war, a force which everywhere surrounds him, and which any one of his actions may render sensitive to explosion. It is amazing to contemplate this ignorance, which, as democracy advances in power, becomes denser and denser, and so dense that the world must inevitably be engaged in unrighteous war. I will, therefore, lay down certain economic rules or maxims as guides² to those who wield political power as if it were a harmless combustible.

Granted that the object with which nations go to war is to attain better, or to ensure against worse, conditions, then the loss of life and capital is compensated for, not by military success, but by the attainment of this object through military effort. Though it may often happen that military success can only procure the desired conditions of policy or stave off the undesired ones, it must not be forgotten that it is only as a *means*, and not as an end, that it is of value, for wars waged otherwise must normally prove uneconomical. This holds good whether the war be offensive or defensive in character, for even if defensive, though the object is not to enforce a policy, it is nevertheless to safeguard a policy the aim of which is to maintain national liberty and prosperity.

From this we may deduce the following, namely, that :

"A military victory is not in itself equivalent to success in war."

What is equivalent to success is a more prosperous peace following the war, and though this condition may seldom be attainable, yet it constitutes an ideal worth striving after.

War not being an end, but a means, the financial situation at its conclusion must be considered coincidentally with the results of military victory in so far as they effect the future well-being of the country. Every man killed means a loss of capital. Every shilling expended is a mortgage of a shilling's worth of production after the war. Wages and prices are thus adversely affected to a definite and calculable extent by each day's operations.

Again, loss of capital resources on the part of the enemy cannot

¹ *Ibid.*, vol. i, pp. 23, 121.

² The following principles are based on a paper on *War Economics*, written by Brigadier-General Ramsay Fairfax, C.M.G., D.S.O., late Royal Navy and Royal Tank Corps.

figure on the credit side of our account ; hence the defence of lavish expenditure as leading to the war bankruptcy of the enemy is unsound, seeing that the enemy is a potential buyer ; and, consequently, to destroy him so utterly that he ceases to possess the power to buy, is to deny ourselves a profitable market, and so strike a blow at our national preservation. Therefore :

" A war, to be economical, must enforce acceptance of the policy under dispute with the least possible harm to commercial prosperity."

Accepting these conclusions, the value of military success decreases in proportion to the total expenditure, and from this it follows that there exists a theoretical limit of expenditure, on exceeding which military success ceases to be on the balance profitable ; consequently all operations not contributing directly to a decision shorten the time available in which it may profitably be sought. It follows then that :

" A military decision, to be economical, must attain more profitable result than the depreciation of capital due to its attainment."

From this it follows that unless each operation contributes to the final victory, in proportion to its cost, it shortens the time available and diminishes the value of eventual victory, or hastens defeat.

The whole of this process of arriving at an economical war policy throughout the history of war has been conspicuous by its absence. In itself it is a science, yet it has never been treated as such ; hence the general chaos of war.¹

The whole of this question of the formulation of war policy is too immense for me to deal with in this book, but I hope that I have dealt with it sufficiently to accentuate its importance. War policy is the continuation of peace policy. During peace-time the power of the government is founded on the national will, and the instrument of the government is national force, of which part is called military power. In war it is the same, and the only remarkable difference is that, whilst during peace-time danger is absent, military power compels the minority to accept the will of the majority. A national danger, threatening majority and minority alike, cancels their differences and enables a government to turn military power outwards, and so compel the enemy to accept this same will in its full national form. War, and not peace, is the true condition which gives expression to nationalism.

¹ In peace-time the object of a government is secure and contented prosperity. This object is based on certain factors ; these factors must not be destroyed in war.